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District Heating

Points in the City of London Proposals

AFTER the many proposals, usually based on imperfect information, that have been put forward for the adoption of district heating on a grandiose scale (despite the Interim Report of the District Heating Committee), the appearance of the report prepared for the Corporation of London, and reviewed on page 624 of this issue, is welcome. Drawn up by Mr. S. B. Donkin, an engineer who has been intimately concerned with electricity supply as well as process steam problems, its approach is factual and its scope is limited to definite conditions which are most favourable to economic success.

The buildings in the devastated area covered by the Donkin report will be mainly of the commercial type in which central heating has been common practice, so that individual objections to the system are less likely than in residential districts. As these buildings will be large, the one-point connections to the hot-water mains will be few. In the replanned streets, subways can presumably be accommodated to take the large mains with adequate protection of electric cables against overheating. It is not proposed to extend the district heating system to streets in which buildings already exist.

Back-Pressure Turbines

Distribution of the heat will no doubt present more problems than its generation. With the use of small independent back-pressure turbines a heat-electric overall production efficiency of 80 per cent is expected, and no attempt will be made to use the exhaust of public supply turbines for the purpose. The difficulty of balancing electrical and heat simultaneous demands thus hardly arises, since the electrical output would probably not exceed the capacity of the grid to absorb it. This division of duties differentiates the present scheme from other proposals, which have been marred also by expectations of a similar high order of thermal efficiency when circumstances indicate the use of pass-out turbines with not much more than half that thermal efficiency.

Difficult Role for Electricity

The difficulties of estimating costs at the present time are illustrated by the uncertainty, when the report was prepared, as to whether official sanction would be given to the erection of the new Bankside power station. The condition imposed that the boilers shall be oil-fired would no doubt rule it out now on grounds of cost as a source of heat. A point open to criticism in the estimates is the assignment to electricity of the role of furnishing "topping-up" heat in very cold weather. The district heating scheme should surely be debited with the heavy expenditure on electrical plant and mains that would be incurred in meeting such occasional undiversified peaks, which would otherwise have to be carried by district heating plant of greater capacity.

The advantages claimed for district heating apply equally to electrical methods with the exception of some saving in coal and in cost per 1,000 B.Th.U. supplied to consumers. These exceptions may well prove to be more than offset by other

factors, such as the greater flexibility of electrical distribution, a more extended use of electricity in 1977 and also the issues raised by Mr. L. F. Stemp in this journal last week. Whatever decision may be reached by the committee of the Corporation to which the report has been referred, it appears evident that the recommendations, though they may serve as a guide in their technical aspects to investigators elsewhere, are not of general application and that each case will have to be considered on its merits with reference to local circumstances.

Cutting German Industry

THE Control Council for the combined Anglo-American Zone of Germany published last week its revised plan for the reduction of German industry, a revision which was found to be necessary if Germany was to make any substantial contribution to European recovery. The number of establishments scheduled for dismantling is now 682, as compared with the 1,636 of the original plan made public early last year. General Robertson, deputy military governor of the British Zone, has stressed that the aim of the plan is to reduce Germany's war potential, not to destroy Germany's ability to compete with the British and American manufacturers. The new list includes 224 "mechanical engineering" plants but only four electrical engineering undertakings.

Load Spreading

AFTER the rather discouraging start of the industrial load-spreading plan on October 6th there seems to have been some improvement although not a general one. For instance it was reported from Leeds last week that there had been a 5 per cent reduction in the "total load" as compared with a week earlier. In Stoke-on-Trent the reduction was said to be between 8 and 10 per cent. Good results were reported from Leicester on the first day of the city's scheme which began on October 13th. In Sheffield industrial establishments were said to be keeping within their targets, although there the large steel-melting plants are not included as they are working three shifts regularly. It was stated last week that the London industrial peak had fallen by between 20 and 25 per cent. But in most areas there appears to have been little appreciation of the needs on the part of domestic consumers and some engineers are dreading the advent of colder weather.

New Power Plant

THE speeding-up of the programme for the installation of new generating plant is reflected in the latest figures issued by the Electricity Commissioners of loans sanctioned by them. The period covered is the six months to September 30th last. During this half-year public authorities were given permission to borrow a total of over £54 million, equivalent to an annual rate of £108 million, or about two and a half times the 1946-47 loan sanctions. Nearly £40 million of the total amount approved related to generating plant and buildings to house it. There was also a substantial rise in the expenditure sanctioned for distribution equipment.

Export Ancillaries

THE Government's attempts to confine the supply of scarce raw materials to firms manufacturing for export are justified at the moment, but they are likely to hit many who are, in some way or another, contributing to the export drive. Attention has already been drawn to the position of makers of certain components who do not export these but supply them to other concerns who embody them in exported machinery and equipment. Means can be found to ensure supplies of material for these, but what is to be done about others whose products are not exportable but are needed by exporting firms in the production of their goods or the maintenance of their plant? Would representations to the Ministry of Supply, backed by certificates of necessity, have any effect?

Gas Production Efficiency

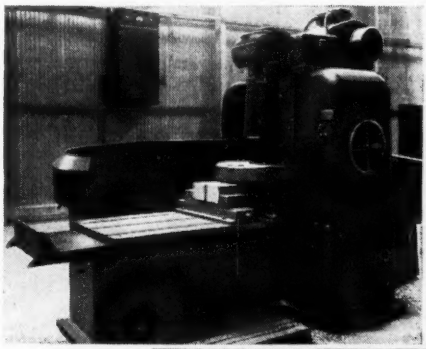
THE latest publication by P.E.P. referred to in this issue contains much information of topical importance. The acceptance of the gas industry's figures of 64 to 75 per cent as the thermal efficiency of production should not, however, remain unchallenged. The arguments advanced by Mr. P. Schiller in his I.E.E. paper last March that the true figure is more nearly 45 per cent or so appear to us incontrovertible.

Light Metals Hot Rolling

Sheet and Strip Production

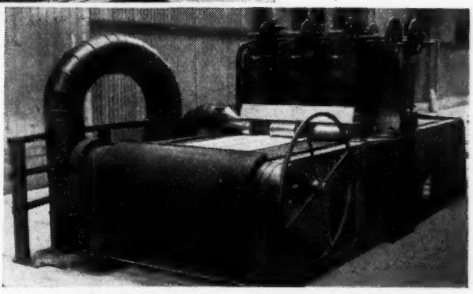
AMONG the various products which we have recently seen manufactured at the factory at Birmingham of Birmetals, Ltd., from "Birmabright" magnesium aluminium and other aluminium alloys are sheet and strip which find their way into other factories to be converted eventually into railway carriage components, coach doors, sinks, automobile body pressings, household utensils, milk churns and aircraft skinning, to quote only a very few of the final wares.

In an article in the *Electrical Review* of June 6th last we described how the raw materials of the factory—28-lb pure aluminium ingots and various alloying elements—are treated in reverberatory furnaces and special casting machines for conversion into billets suitable for the extrusion of all manner of sections. These initial processes also apply to the production of the billets for sheet and strip rolling. It is, however, customary to call a rectangular billet a "slab," and this nomenclature will be adopted where we refer to rectangular billets. In this case, the slabs are from 18 in. by 6 in. to 36 in. by 8 in. in section and 3 ft long, and weigh from 390 to 1,040 lb each.



On plano-milling machines the rough cast surfaces are removed from the slabs

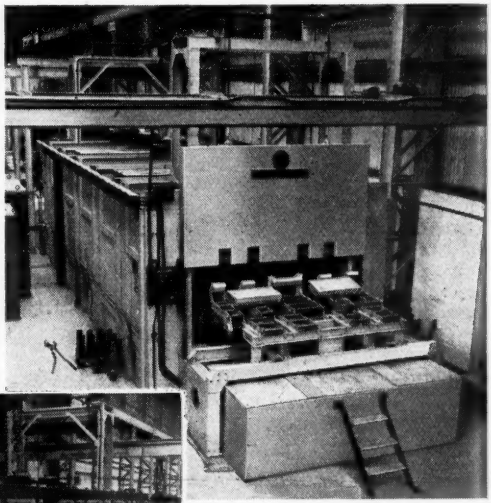
From the metal stores the slabs are issued to the scalping shop where, on plano-milling machines or lathes, the rough cast surfaces are removed from the slabs. The slabs are handled to and from these machines by electric hoists on overhead runways. A typical equipment used for this work is a horizontal plano-milling machine in which the slab is clamped in a vice on the milling table which travels under the circular tool head which carries twelve tungsten carbide cutters. Transmission from the 25-h.p., 1,440-r.p.m. motor surmounting the machine is by "V" belts to the vertical shaft through a change-gear unit which gives final spindle speeds of 120, 170 and 240 r.p.m. The motor is directly started from a push-button station on the machine. Slabs not requiring plating are conveyed direct to the breaking down mill. Those to be plated are transported by a gravity-feed conveyor to a station where, after the removal of all grease from the faces by means of "Swan" spirit, the two wider faces of each slab are covered with high-purity aluminium plates which are strapped on to the slab by "Signode" banding wire. The purpose of these plates is to protect the core of the metal from corrosion throughout its life. During the rolling operations, under heat and pressure, the plate becomes welded to the slab and remains as a skin on the metal. To ensure a perfectly clean surface on the sides of the plates which make contact with the scalped slabs, and thus prevent blistering later, the plates are subjected to a scouring operation on brushing machines before they are applied to the slabs.

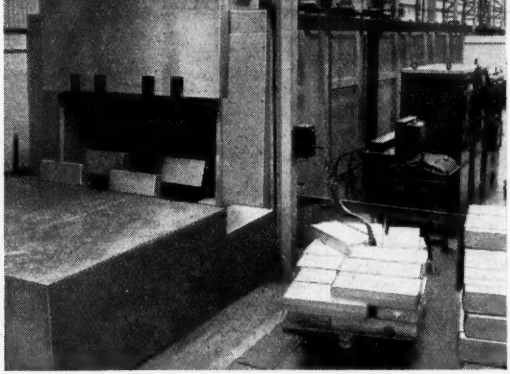


A typical brushing machine has five axial wire brushes which bear down on the plate surfaces

A typical brushing machine has five axial wire brushes which bear down on the plate surfaces as the plates pass through on an endless conveyor. Each brush is directly driven by its own vertical 2-h.p., 1,430-r.p.m. motor which is under push-button control. There are also two other motors on the machine, one serving a dust extractor and the other driving the conveyor. The conveyor motor transmission is through belt and worm gear with a reduction to give a conveyor speed of only a few feet per minute.

Preheating of the plated slabs, before rolling, is carried out in two G.W.B. pusher-type electric furnaces, each rated at 430 kW and having an output of 2 tons per hour. The furnace actually holds about 80 slabs. The slabs are carried vertically on cast shoes and are pushed through the furnace on idler rollers by an electric ram. The slabs are not, therefore, subjected to abrasion or compression, as the load is taken entirely by the carrier shoes.



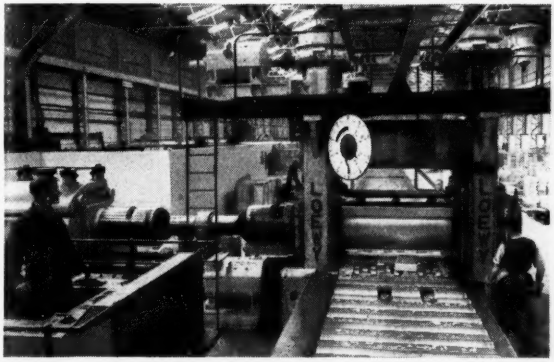


Preheating of slabs is carried out in pusher-type 430-kW, 2-tons-per-hour furnaces; loading end (left); unloading end (above)

The furnaces are charged by overhead travelling hoists and discharged by an automatic discharge gear. The latter removes the slabs from the shoes and places them, in a horizontal position, on the roller discharge table whence they are taken to the breaking down mill. The shoes are then returned on a gravity conveyor to the charging end, for further use.

The doors at both ends of the furnace are electrically operated and interlocked with the pusher and discharge gears to provide automatic operation. The furnace operating temperature of about 440 deg C is controlled automatically by pyrometric regulators, working in conjunction with ironclad contactor gear, and a further instrument is fitted to give a continuous recording of the temperature. A standard oil immersed circuit breaker completes the electrical equipment of the furnace. Centrifugal fans afford the high-speed air circulation in the furnace which is so essential in the treatment of aluminium alloys.

The breaking-down or main reversing mill is driven by a 1,600-h.p. d.c. motor with a speed range of 0/40–51 r.p.m. This motor is operated from a Ward-Leonard-Ilgner generating set, which comprises a 1,600-h.p., 11-kV synchronous induction motor directly coupled to two 670-kV compensated d.c. generators and a flywheel. The latter, which is an integral feature of the Ilgner system, has



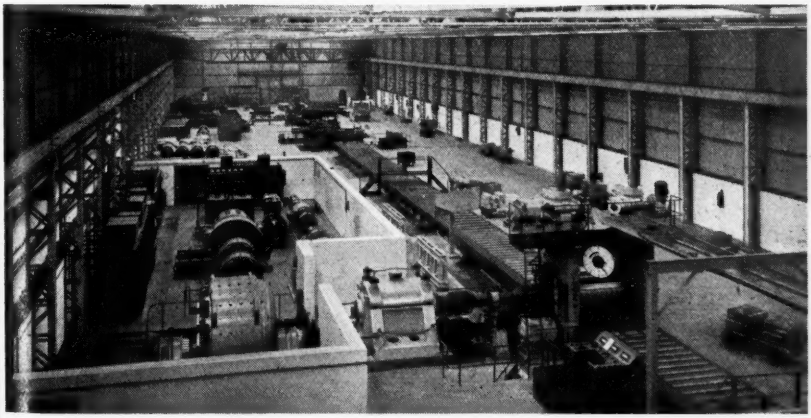
The first rear table is permanently under the control of mill operator from the control deck adjacent to the rolls

a stored energy of 70,000 h.p.-sec. The generators are connected in parallel and their series windings are cross-connected through hand-operated circuit breakers to enable the load to be shared equally.

Owing to the rapid reversals which are required it is necessary to "force" both the generator and the mill motor fields, each of which has its own exciter. Whenever the speed of the mill motor does not conform to the position of its master controller the necessary "forcing" of the field is effected automatically by the two exciters developing a very high voltage, which is immediately lowered to normal as the correct speed is attained. The controlling factor in this latter action is the balancing of the voltage derived from the mill motor tachometer generator and the steady voltage automatically selected when the master controller is moved. When these voltages become equal a balancing relay terminates the "forcing" conditions.

To prevent "skidding" of the material being rolled, it is important that the roller tables on both sides of the mill shall at all times run at speeds corresponding to the entry and delivery speeds of the mill. To effect this the mill table motors are all fed from a generator which is excited from the armature voltage of the main mill motor. In addition a booster is provided which may be connected in series with the set of live rolls on either side of the mill, thus bringing about the necessary difference in speed between the entry and delivery tables. This booster is also excited from the main mill motor armature, so maintaining the correct relationship between the mill and table speeds. "Forcing" arrangements generally similar to those described previously are provided for both the generator and the booster.

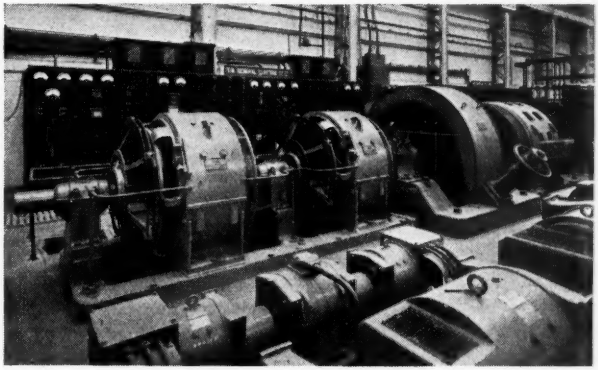
In the next stage the strip passes to the rear roller tables. The first rear table is



The main reversing mill is driven by a 1,600 h.p., d.c. motor

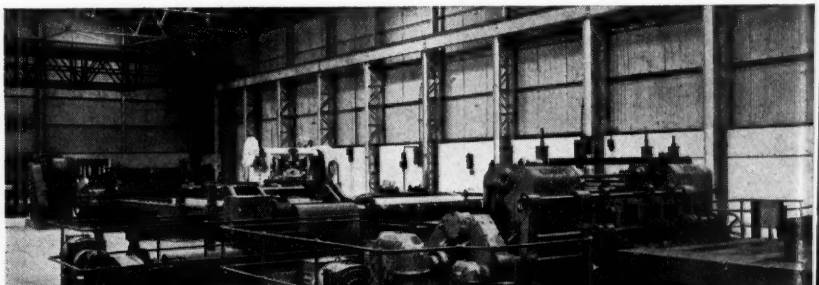
permanently under the control of the mill operator, from the main control desk adjacent to the rolls, but the two remaining tables can be controlled either from the main control desk or from the shear line operator's desk some distance along the rear roller tables.

Leaving the rear tables, the strip enters the slitting shear, which is driven by a 10-h.p., 230-V, 300/900-r.p.m. motor which, in turn, is supplied from the 100-kV slitting and coiling generator. Here the strip is trimmed to the desired width. Associated with the slitting shear is a scrap cutter, driven by a 3·3/10-h.p., 230-V, 300/900-r.p.m. d.c. motor, which shears the trimmings cut off by the slitting shear into lengths convenient for handling. From the slitting stage the strip enters the pinch rolls and then passes either to (*a*) the flying shear, where it is cut into the required lengths, these being piled by the "piler," or to (*b*) the "coiler," where the strips are coiled up so as to be ready for removal. The flying shear is controlled by a master controller which provides for (*a*) individual cuts, under push-button control, (*b*) continuous cutting, under mechanical control, or (*c*) automatic cutting to length, under photo-electric control.

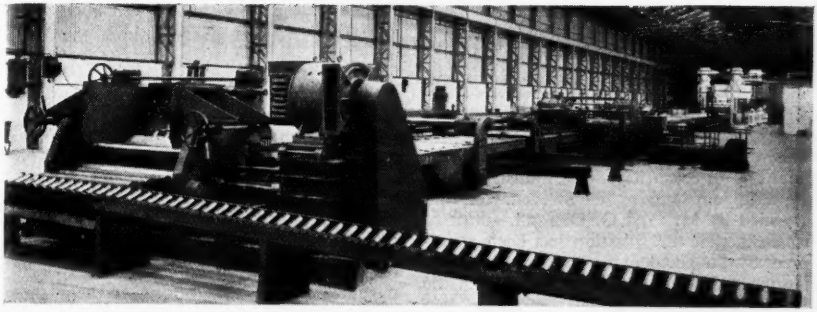


Breaking-down mill motor operated from a Ward-Leonard-Ilgner generating set with a 1,600-h.p., 11-kV motor and two 670-kW generators

It will be noted that the various stages of rolling and cutting are operated by separate generators and their exciters, so as to give independent control of each section. The installation therefore includes a considerable number of motors ranging from 1 h.p. to 350 h.p. Excluding the mill, Ilgner set and main exciter motors, of 1,600 h.p., 1,600 h.p. and 350 h.p., respectively, there are some 28 additional motors totalling approximately 770 h.p. All the motors were supplied by the General Electric Co., Ltd. The switchboards are of the G.E.C. standard open contactor type. The main d.c. board is in two sections: (1) controlling the mill motor, the two d.c. generators and the main exciter set, and (2)



Slitting shear driven by a 10-h.p., 300/900-r.p.m. motor; associated with it is the scrap cutter



For the slitting stage the strip passes either to the flying shear or to the coiler (foreground)

controlling the shearing and coil line motors and exciters. Each section has its own control desk, situated in a convenient position. An a.c. open contactor-type switchboard controls all the a.c. auxiliaries. Limit switches are provided for each of the individual drives or operations.

The cables throughout are of Pirelli-General make. The 11-kV stator of the 1,600-h.p. induction motor is fed by a p.i.l.c. cable with 0·075-sq in. conductors. Connections between the sliprings on the 1,370-V rotor of this motor and the liquid starter are made by three 0·4-sq in. single-core cambric-insulated, lead-covered cables. The 665-kV (working peak) generator is connected to the switchboard by means of 4 in. by $\frac{1}{8}$ in. h.c., h.d. laminated copper busbars. For the remaining motors, the conductors are cambric insulated, whilst v.i.r. cables are used for the controls and subsidiary circuits.

The reduction on the breaking-down mill is from 6-8 in. slab thickness to $\frac{1}{16}$ in. thickness in 12 to 22 passes, according to the width of the sheet and type of material. The coils from the breaking-down mill usually contain from 30 ft to 70 ft of strip, 24 in. to 54 in. wide, and $\frac{1}{16}$ in. thick.

Illuminating Engineers

Qualifications and Training

THE training of illuminating engineers was the subject of the presidential address by DR. J. W. T. WALSH (N.P.L.) to the Illuminating Engineering Society, which has tried to be cultural in character without attempting to join the ranks of the professional institutions. The art and practice have, however, progressed to the stage of creating a new profession and the Society has therefore been faced with the alternatives of admitting to membership only lighting engineers, thereby changing the basis upon which it has worked for so long, or of retaining its cultural status without trying to apply any professional hall-mark to those of its members who are engaged in the engineering branch of the art of lighting.

Dr. Walsh said that a compromise had been found by which to make the required distinction without affecting the conditions of membership. But the granting of such distinction necessitated definition of the qualifications expected of competent lighting engineers.

He hoped the Society would pitch its demands high, since it was important that the profession should quickly recognize the need for severe discipline on the part of those entering it. They should be prepared for at least five years of part-time theoretical study and practical training covering that period with, at least, three further years of more advanced practice.

After suggesting examination standards that might be demanded, Dr. Walsh emphasized the danger of too early specialization before adequate knowledge of principles had been acquired. He appealed to employers to accept the need for trainees to move from one section to another within the same organization, and also from one firm to another, in order to broaden their experience, which would ultimately benefit both individuals and the profession as a whole.

Heating-Plant Circulators

A NEW British Standard (B.S. 1394: 1947) relates to power-driven rotary pumps for circulating water in heating mains at maximum temperatures of 200 deg F and static heads of 100 ft. Its scope covers materials, motors, alignment, site assembly, installation and testing. Copies are obtainable from the British Standards Institution, 28, Victoria Street, London, S.W.1, at 2s. net.

Views on the News

Reflections on Current Topics

RECENT editorial commentary in the *Electrical Review* on the effect of drought in other countries referred to the rationing of electricity for industrial and domestic consumers in Sweden. I am informed by Mr. Tell G. Dahlloff, editor of *Industria*, that the situation has been aggravated by an accident at the reserve steam station at Vasteras which has put one of the generators out of action for about two months. Traffic on the electrified railways has been considerably curtailed and a number of industries, including several steel works, have had to cut down production drastically.

* * *

For about the sixth time the Fuel Ministry has come to realize that the rationing of gas and electricity is impracticable and it is a pity that some others have not yet reached the same conclusion. One pernicious form of rationing now being advocated is the institution of prohibitive charges for anything above a "basic" consumption. This, as was pointed out in the *Electrical Review* years ago when rationing was first in the air, would merely be penalizing the poorer consumer; those who could afford to pay wouldn't be worried a great deal. Such a system has just been started in Poland where the "excess" consumption is charged for at 7½ times the "basic" rate. There may possibly be directions in which we could benefit from the Polish example but I feel that this is not one of them.

* * *

How heartily do I agree with Mr. N. E. Kearley, deputy director of the Council of Industrial Design, in his condemnation of the abuse of the word "streamlined." Like too many words nowadays it is being done to death and is seldom used correctly. As Mr. Kearley pointed out in last Sunday's *Observer* it is properly applied only when it relates to the overcoming of air or water resistance in rapid movement. He says "it is absurd to talk of streamlining a refrigerator, cooker or coffee-pot." He admits that there may be some justification for its use in connection with an electric iron "because the iron does plough its way through the creases of fabric." I won't agree even with this unless the iron is to be operated at speeds of over, say, 60 m.p.h. Let my readers take this to heart, at the same time resolving not to use the word "priority" when preference is what they mean.

* * *

Most enlightened employers to-day are concerned to some extent with the welfare of the young people in their employment, particularly in endeavouring to help these employees to spend their leisure time to the best advantage. Youth clubs are a means of getting these young people together and usefully co-ordinating their activities. In this matter, I am told, employers can obtain a great deal of help from the National Association of Girls' Clubs and Mixed Clubs, 30-32, Devonshire Street, London, W.1. Among the facilities provided by the Association, of which H.M. the Queen is patron, are holiday centres and a club house in London.

* * *

There seems quite a lot to be said for being a cow these days. Not only are the most up-to-date dairy farms equipped with electric milking arrangements, food preparation machinery and fluorescent lighting but additional amenities are now being provided in the form of electric heating and radio. From Scotland comes the news of the successful use of a new system of floor heating in byres, while a Surrey farmer writing to the *Radio Times* declares that his cows give their highest milk yields to the strains of eighteenth-century chamber music. Apparently one has to be careful over the choice of programme for a cow is definitely high-brow. "Music of the modern idiom," says the writer, "often calms them into lying down at the wrong time; 'swing' definitely creates a 'kicking the bucket' tendency." So if any of our farming readers are thinking of following this example they would probably be well advised to stick to the Third Programme.

* * *

The Glasgow *Daily Record* reports the striking of a vein of gold during the tunnelling operations in the Glen Affric hydro-electric scheme. This arouses visions of the scheme's paying for itself before it goes into service, although such a discovery is likely to divert the workers' thoughts from the main job.

—REFLECTOR.

Induction-Type Instruments

Theory of Operation

By Edward Hughes,
D.Sc., M.I.E.E.

EXPLANATIONS of the action of induction-type instruments given in textbooks are unconvincing and the purpose of this article is to suggest an approach that may be useful to students studying this subject for the first time. Methods of treatment may, in general, be divided into two categories: the gliding- or shifting-field theory, which was exploded by Mr. G. F. Shotter in his chairman's address to the I.E.E. Meter and Instrument Section in November, 1936, and the transformer theory. Judging by the way in which the latter theory is usually presented in textbooks, one cannot help wondering how many authors are really clear on it. Possibly the following treatment may appear lengthy, but it is based on first principles without any "wangling" of signs of mathematical formulæ to get the desired result. The reader is assumed to be acquainted with the mechanical construction of these instruments.

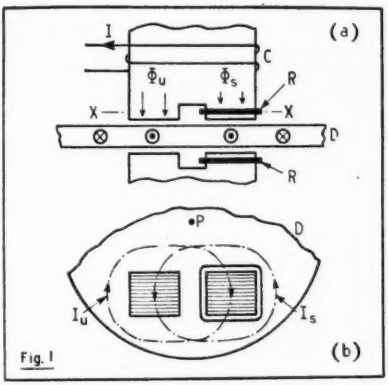


Fig. 1

Induction-type Ammeters and Voltmeters.—Fig. 1 shows the essential features of this type of instrument, the lower diagram being a sectional plan at XX, but disc D has been shown thick to enable the direction of the eddy currents to be clearly indicated.

Let Φ_s in Fig. 2 represent the flux in the shaded portion; then E_R and I_R represent the induced e.m.f. and the current in shading rings R, the lag of I_R behind E_R being small owing to the resistance of the rings being high compared with their reactance at 50 cycles per sec. If T be the number of turns on coil C, then (IT)′ represents the component of the primary ampere-turns to neutralize the demagnetizing ampere-turns of R. Also $(IT)_{mag}$, in phase with Φ_s, represents the component to send Φ_s through the reluctance of the shaded portion of the magnetic circuit, and the total ampere-turns provided by coil C are represented by IT in Fig. 2. All these ampere-turns are available to send flux Φ_u through the reluctance of the unshaded portion of the magnetic circuit; consequently Φ_u is in phase with the current in C. The demagnetizing effect of the eddy currents in disc D has been neglected, partly because the disc is thin and offers a high resistance to the eddy currents and partly because their effect is only to modify the phases of both fluxes but still allowing Φ_s to lag behind Φ_u.

Let us now consider the eddy currents I_u and I_s induced in disc D by alternating fluxes Φ_u and Φ_s respectively. These currents are practically in phase with their respective e.m.f.s and therefore lag 90 deg. behind the respective fluxes, as shown in

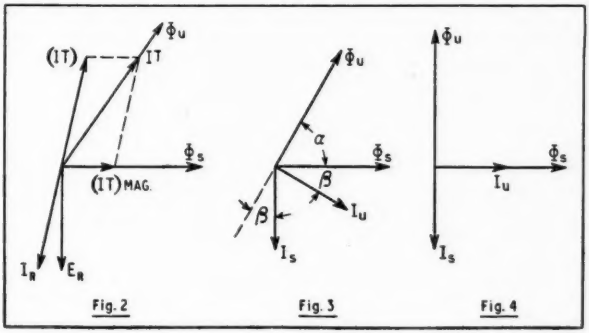


Fig. 3. From Fig. 1, it is seen that at least a part of I_s flows across flux Φ_u and a part of I_u flows across flux Φ_s; and from Fig. 3 it follows that the torque due to I_u and Φ_s

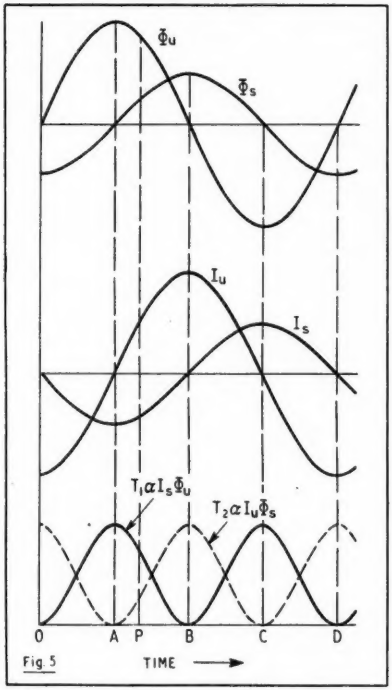


Fig. 5

is proportional to $I_u\Phi_s \cos\beta$ or $I_u\Phi_s \sin\alpha$; and that the torque due to I_s and Φ_u is proportional to $I_s\Phi_u \cos(180 - \beta)$ or $-I_s\Phi_u \sin\alpha$.

Now we come to the crux of the problem. Are these two torques in opposition or are they helping each other? It is on this point that explanations found in textbooks are unsatisfactory. Several textbooks state they are in opposition and then proceed to add the torques together, either by neglecting the minus sign or by inserting an additional minus sign—a procedure that appears a pure "wangle" to the uninitiated. I suggest that the obvious conclusion from the above expressions is that the two torques tend to neutralize each other.

Examining the problem in greater detail, for simplicity let us assume the phase difference α between Φ_u and Φ_s to be 90 deg (Fig. 4). Consequently, the two torques are proportional to $I_u\Phi_s$ and $-I_s\Phi_u$ respectively. A simple method of deciding whether these torques are opposing or helping each other is to represent these quantities by curves as in Fig. 5.

Consider instant P, when the two fluxes Φ_u and Φ_s are positive, but Φ_u is *decreasing* and Φ_s is *increasing*. Assume the fluxes in Fig. 1 (*a*) to be positive when their direction is downwards. Consequently the direction of I_u at instant P is such as to try to prevent Φ_u decreasing, i.e., I_u is outwards in the portion of D that is opposite the shaded pole. On the other hand, I_s is trying to oppose the growth of Φ_s and is therefore outwards in the portion of D that is opposite the unshaded pole. It follows that at instant P the fluxes in the shaded and unshaded poles are downwards and the currents in those portions of the disc that are opposite these poles are both outwards. Consequently the two fluxes are distorted in such directions as to exert torques towards the right in

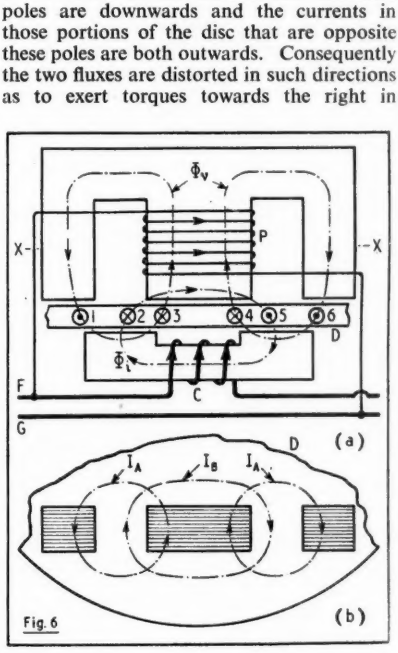


Fig. 6

Fig. 1 (*a*); i.e., the two torques can be regarded as being both *positive* at instant P in Fig. 5.

Having made this decision, we can now proceed to derive the waveforms of the two torques during a whole cycle. From Fig. 5 torque T_1 due to Φ_u and I_s is zero at O, B and D and is unidirectional. Similarly,

torque T_2 due to Φ_s and I_u is zero at A and C and is also unidirectional. It is immaterial whether the peak values of the torques are equal. The important conclusion is that the two torques are assisting each other in trying to rotate the disc anti-clockwise in Fig. 1 (*b*); and we can now revert to Fig. 3 and state that total deflecting torque $\propto (I_u\Phi_s \sin\alpha + I_s\Phi_u \sin\alpha) \propto I^2 \sin\alpha$. Hence the instrument reads the r.m.s. value of the current (or voltage).

Induction-type Wattmeter and Watt-hour Meter.—These instruments usually consist of a thin aluminium disc D between two electromagnets, as shown simply in Fig. 6. Again, the disc is shown thick to enable the directions of the eddy currents to be clearly indicated.

Current coil C produces a flux in phase with the load current and some of this flux, represented by Φ_i in Fig. 6 (*a*), passes across the disc and induces eddy currents I_A, as shown in Fig. 6 (*b*). The potential coil P produces flux Φ_v, some of which passes across the disc and induces eddy current I_B in the latter, as shown in Fig. 6 (*b*). As a means of simplifying matters, we shall assume that Φ_v lags a quarter of a cycle behind the applied voltage, and a method of attaining this relationship will be referred to later. From the earlier discussion, it follows that I_A lags 90 deg behind Φ_i and I_B lags 90 deg behind Φ_v.

Let us first consider the case of a load of unity power factor, so that the various quantities are represented vectorially in Fig. 7. From Fig. 6 (*b*), eddy current I_A flows across flux Φ_v, whilst I_B flows across flux Φ_i. Consequently there is one torque proportional to $I_A\Phi_v$ and another torque proportional to $I_B\Phi_i$ cos 180 deg, namely

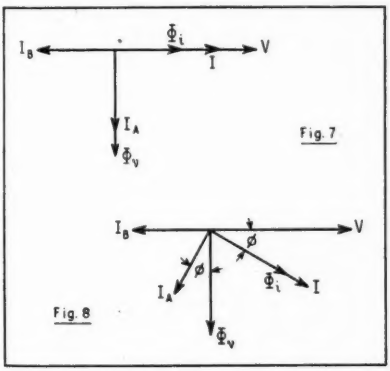


Fig. 7

Fig. 8

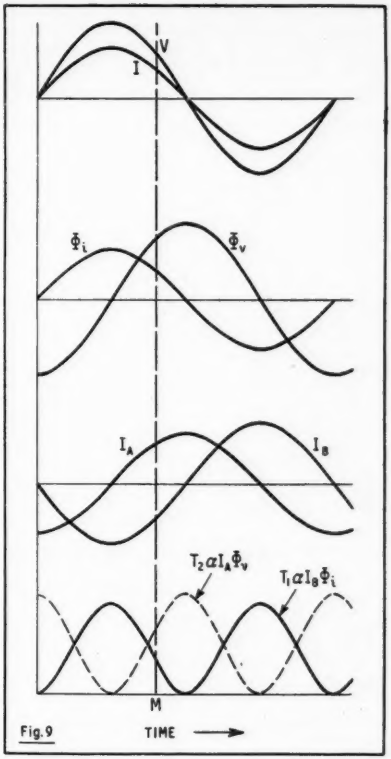


Fig. 9

$-I_B\Phi_i$. Again we are up against the difficulty of deciding whether these two torques are opposing or helping each other. In view of the previous discussion of the shaded-pole instrument, we could surmise that they are helping each other; but it will be seen that the magnetic circuits of Figs. 1 and 6 are sufficiently different to make such a conclusion unconvincing.

Consider, therefore, what is happening at instant M in Fig. 9, and assume that in Fig. 6, wire F is positive relatively to G when the voltage in Fig. 9 is positive. Hence at instant M, the currents in coils C and P, and their fluxes, are in the directions indicated by arrowheads in Fig. 6. But Φ_i is decreasing and I_A tries to prevent this *decrease* and must therefore have the directions represented by crosses and dots in circles 1, 3, 4 and 6 on disc D in Fig. 6 (*a*). On the other hand, Φ_v is increasing and I_B, in trying to oppose this *increase*, has the directions represented by

cross and dot in circles 2 and 5 respectively.

From Fig. 6 (*a*), it is seen that circles 1, 5 and 6 represent currents flowing outwards across magnetic fields that are downwards, whilst circles 2, 3 and 4 represent currents

flowing inwards across fields that are upwards. Hence *all* these currents exert torque urging the disc anti-clockwise; i.e. torque T_1 due to I_B and Φ_i is in the same direction as torque T_2 due to I_A and Φ_v. From Fig. 9 it follows that at no instant do the two torques oppose each other and that total driving torque $\propto I_A\Phi_v + I_B\Phi_i \propto$ VI, namely the power at unity p.f., since $I_B \propto \Phi_v \propto$ supply voltage V and $I_A \propto \Phi_i \propto$ load current I.

We can now consider the general case of the load current I lagging by an angle ϕ behind the supply voltage V, as shown in Fig. 8. From the above discussion, it follows that total driving torque $\propto I_A\Phi_v \cos\phi + I_B\Phi_i \cos\phi, \propto$ VI $\cos\phi \propto$ power.

Exact quadrature relationship between Φ_v and the supply voltage can be obtained by means of a copper ring R on an extension of the centre limb, as in Fig. 10. The outer limbs are shaped as shown so as to increase the inductance of the voltage coil P. The action of R is similar to that of the shading-ring in the shaded-pole instrument, i.e., the flux Φ_v through R lags behind flux Φ_u in the unshaded part of the magnetic circuit, and exact quadrature between Φ_v and the applied voltage is obtained by adjusting the position of R.

Meaford Generating Station

Official Inauguration by Mr. Shinwell

THE new 120,000-kW generating station of the North West Midlands Joint Electricity Authority at Meaford, near Stone, the layout and erection of which were fully described in the *Electrical Review* of January 31st, was officially opened by Mr. E. Shinwell last Monday. The station contains four G.E.C. 30,000-kW (m.c.r.) turbo-alternators and six Babcock & Wilcox 240,000 lb per hr (m.c.r.) pulverized fuel boilers. Steam conditions at the superheater stop valve are 650 lb per sq in and 850 deg F. Each alternator is connected through a 33-MVA, 11·8/132-kV transformer to its 132-kV switchgear. Sewage effluent is used for the make-up and surge water of the cooling towers. The office building has heated coils concealed in the ceilings and floors and the heating water supply is to be obtained from a heat pump in the turbine house.

The station is expected to be completed by June next, and the annual output thereafter will be 550 million kWh, based on an annual load factor of 55 per cent. The average coal consumption for a year's operation, based on coal having a calorific value of 11,700 B.Th.U. per lb, is estimated to be 281,000 tons. The capital cost of the station is stated to be £5,000,000. Experimental borings have been taken with a view to sinking a colliery within easy delivering distance of the station.

At the inauguration ceremony Mr. Shinwell said that the nationalization of the electricity industry was being brought about by the Government not because of any incapacity or lack of ability on the part of administrators, but because such an industry should not be the prerogative of private individuals. With full co-operation of those in the industry nationalization would, he believed, be an unqualified success.

The King's Speech

NEW legislation foreshadowed in the King's Speech to Parliament on Tuesday will provide for the revision of the Parliament Act of 1911, under which the Peers can delay the passing of Bills, except financial measures, for a period up to two years; the expansion of Empire production; the best use of man-power, bringing into essential work people who are making no contribution to national well-being; and the nationalization of the gas industry. Parliament would be asked to approve supplementary financial measures at an early stage of the session. His Majesty said that the first aim of his Ministers would be to redress the adverse balance of external payments, particularly by expanding exports. This would demand increased production and the sale abroad of a larger share of output. The tasks to be performed by each industry had been set out and, in conjunction with all those engaged in industry, the Government would do its best to provide the means to carry out these tasks.

PERSONAL and SOCIAL

News of Men and Women of the Industry

IN this issue the British Electricity Authority is advertising for an education and training officer in its Labour Relations Department (£1,500-£50-£2,000), an assistant secretary at the same salary and an administrative officer (£900-£35-£1,250). Other positions advertised are deputy electrical engineer and manager at Reading and assistant electrical engineer at Leek (Staffs).

Dr. H. R. Wright, chairman and managing director of Siemens Bros. & Co., Ltd., was the guest of honour at a luncheon held recently in the library at the Company's Woolwich works when he was presented with an inscribed silver salver from members of his senior staff to mark his completion of twenty-one years as managing director. Mr. S. W. Lumb, secretary to the company, welcomed Dr. Wright, and mentioned that it was forty years ago that Dr. Wright went to the Woolwich works, after three years at the Stafford works. The presentation was made by Mr. F. Turner, who, with forty-nine years' service, was the oldest and longest serving member of those associated with the presentation. He spoke of the great development and expansion that had taken place under Dr. Wright's management.

Bust of Dr. H. R. Wright

Dr. Wright, in expressing his thanks and appreciation, spoke of the excellent relations existing between management and staff and briefly reviewed the company's activities and growth. He made special reference to its pioneering work and interest in the social welfare of its employees.

Mr. G. W. Giffin, M.B.E., general works manager, then announced that the directors had commissioned Mr. Benno Elkan, a sculptor of international reputation, to execute a bronze bust of Dr. Wright, which was now on view for the first time; the bust was to have its permanent home at the Woolwich works. Mr. E. Thomas, manager of the Export Department, expressed the pleasure of the staff at this gesture of the board.

The Scottish Secretary has appointed **Sir Frank Mears**, P.R.S.A., F.R.I.B.A., who is at present a member of the Amenity Committee under the Scottish Hydro-Electric Development Act, to be chairman in place of Colonel the Hon. Ian Campbell, D.S.O., who has resigned. Colonel Campbell, who is and will continue to be a member of the Fisheries Committee, is no longer able to afford the time necessary for the two Committees.

Mr. G. W. Essex, A.M.I.E.E., has resigned from his post as national negotiations secretary with the Electrical Power Engineers' Association to take up an appointment in the Labour Relations Department of the British Electricity Authority. Mr. Essex has been on the secretarial staff of the E.P.E.A. since 1921, having previously been on the distribution staffs of the Cleveland & Durham Electric Supply Co., Sunderland Corporation and the old Newcastle & District Supply Co. He was the only remaining founder member on the staff side of the Electricity Supply Industry National Joint Board, on which he has played a prominent part since it was established in 1919. Much that has been done by the technical staffs in the supply industry in making the E.P.E.A. completely representative of the salaried officials and effective in establishing agreement on salaries and conditions of service is due to Mr. Essex.

Mr. G. W. Essex

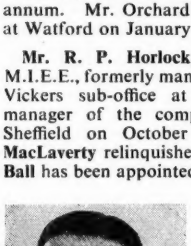
Mr. H. J. Mildren, M.B.E., formerly Assistant Director of Communications, Components Production, Ministry of Supply, has joined the staff of A.B. Metal Products, Ltd.

Mr. F. C. Orchard, M.I.E.E., A.M.I.Mech.E., who, as we reported in our last issue, has been appointed to succeed Mr. A. W. Barham as chief electrical engineer and manager of the Watford Corporation electricity undertaking, is at present chief engineer and manager at Hornsey. Before going to Hornsey Mr. Orchard was with the Birmingham Corporation Electricity Supply Department from May 1923, to December 1935, when he served in the mains department and the automatic substation maintenance department. Later he was in charge of the automatic substation constructional department, being responsible

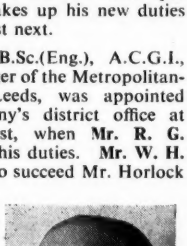
Mr. F. C. Orchard

for change of frequency of plant from 25 to 50 cycles. During the twelve years he has been "chief" at Hornsey, sales of electricity have risen from ten to thirty-six million kWh per annum. Mr. Orchard takes up his new duties at Watford on January 1st next.

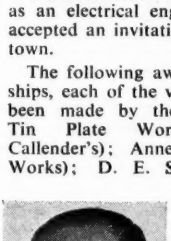
Mr. R. P. Horlock, B.Sc.(Eng.), A.C.G.I., M.I.E.E., formerly manager of the Metropolitan-Vickers sub-office at Leeds, was appointed manager of the company's district office at Sheffield on October 1st, when **Mr. R. G. MacLaverty** relinquished his duties. **Mr. W. H. Ball** has been appointed to succeed Mr. Horlock as manager of Leeds sub-office, which is now attached to the Sheffield district office.



Mr. R. P. Horlock



Mr. R. G. MacLaverty



Mr. W. H. Ball

Mr. MacLaverty, who is remaining with the company for consultation until the end of the year, joined its predecessor, the British Westinghouse Electrical & Manufacturing Co., at Trafford Park, in 1903. At the end of that year he was transferred to the Glasgow district office, and in 1907 went to the Newcastle office, where he took charge of activities in the Darlington and Middlesbrough area. He became manager of the Sheffield district office in 1919.

Mr. Horlock joined the company as a college apprentice in 1928, after obtaining an honours degree at the Imperial College of Science and Technology, City and Guilds (Eng.) College. He was then appointed to the rolling mill section of the Plant Engineering Department, and after a short period in the London office in 1933 he returned to Trafford Park for further work on rolling mill equipment and on manufacturers' committees. In 1941 he became manager of the Leeds sub-office. He is vice-chairman of the North Midland Centre of the I.E.E.

Mr. Ball started his engineering career in 1912 as a student at the Dick Kerr works at Preston (later part of the English Electric Co., Ltd.). After naval service in the 1914-18 war he rejoined the English Electric Co. In 1922 he transferred to the Swedish General Electric Co., and after a period in their works in Sweden, he represented them in India for three years. In 1927 he joined the Motor Sales Department of Metropolitan-Vickers and five years later was transferred to the Manchester office; here he acted as the company's representative in the Bradford area, specializing in the application of electricity to the machine tool and textile industries.

Councillor W. R. Blackburn, who is in business as an electrical engineer at Colwyn Bay, has accepted an invitation to become mayor of the town.

The following awards for travelling scholarships, each of the value of £50, for 1947, have been made by the Worshipful Company of Tin Plate Workers :— R. Lester (B.I. Callender's); Anne O'Riordan (Enfield Cable Works); D. E. S. Hill (W. T. Henley's); D. C. Roos (Oldfield Engineering Co.); D. T. Jones (W. T. Henley's); L. Roblin (Rd. Thomas & Baldwins); D. Palmer (Glasgow Corporation Transport); and G. A. Bench (International Combustion).

Two prizes each of £10 value have been awarded to L. G. Evans (Glynhir Tinplate Co.) and B. H. Woodward (International Combustion). In addition the Committee has confirmed the award of two travelling scholarships, each of £50 value, made by the City and Guilds of London Institute, Department of Technology to A. Ince (Standard Motor Co.) and J. E. Batey (Burnley Gas Department).

Mr. J. A. Owen, M.I.Mech.E., has been appointed managing director of the Consolidated Pneumatic Tool Co., Ltd., in succession to **Mr. H. Bird,** who has resigned.

Mr. D. J. W. Harvey, M.I.E.E., area chief electrical engineer, Fife and Clackmannan Area, Scottish Division of the National Coal Board, who is chairman of the North - East Scotland Sub-Centre of the Institution of Electrical Engineers, received his technical education at Heriot Watt College, and his training with the Musselburgh Electric Light & Traction Co., Ltd., Bo'ness Electricity Department, and Edinburgh Electricity Department. He became chief draughtsman with the Edinburgh undertaking in 1930 and in 1933 was appointed substation superintendent at Sunderland.

Mr. D. J. W. Harvey

In 1939 Mr. Harvey went to Kirkcaldy as mains superintendent, where he subsequently became deputy electrical engineer in 1941 and engineer

and manager in 1943. He left this position at the end of May this year to take up his present position with the National Coal Board.

Mr. J. A. Walker, M.I.E.E., whose portrait we reproduce herewith, is chairman of the Sheffield Sub-Centre of the I.E.E. for the 1947-48 session. He received his technical training at the College of Technology, Manchester, and during the 1914-18 war held a commission in the Royal Engineers (Signals). In 1919 he joined the Metropolitan-Vickers Electrical Co., Ltd., as a school apprentice, and has since served in various departments of the company and is now at the Sheffield District Office. He has been lecturer in electrical theory at the College of Technology, Sheffield, for the last eight years.

Mr. J. A. Walker

Mr. A. S. Bradford has joined the staff of H. J. Baldwin & Co., Ltd., as assistant engineer in the Joint Box and Transmission Department. Mr. Bradford recently was chief draughtsman with Enfield Cables, Ltd.

Mr. T. W. J. Temple, A.M.I.E.E., A.R.Ae.S., has joined the Newcastle-on-Tyne office of the British Thomson-Houston Co., Ltd. Mr. Temple is an ex-student apprentice of the company, and before the war was at the Sheffield office. During the war he served in the Technical Branch of the R.A.F., attaining the rank of wing commander, and on rejoining the B.T.H. Co. in February, 1946, he was transferred to the Leeds office.

Mr. T. McGreevy, M.Sc., A.M.I.E.E., of Oldham Technical College, has been appointed head of the electrical engineering department at Portsmouth Municipal College. He is chairman of the East Lancashire Division of the Association of Teachers in Technical Institutions.

The Erith Corporation Electricity Committee at its meeting on October 6th, appointed **Mr. H. W. C. Griffin,** A.M.I.E.E., as deputy borough electrical engineer and manager. Mr. Griffin was previously mains superintendent with the undertaking, and formerly held appointments with the Plymouth, Hampstead and Poplar Electricity Departments.

Mr. S. Shaw, A.M.I.E.E., consumers' engineer to the Buckrose Light & Power Co., Ltd., has been appointed consumers' engineer at Stafford.

Mr. P. G. Campling, M.I.E.E., M.I.Mech.E., chief engineer and general manager of the Bedford Corporation Electricity undertaking, has been appointed to direct the construction of the proposed new power station at Goldington, Bedford. Work is planned to start after April 1st, 1948. The consulting engineers will be Merz & McLellan, and Sir Alexander Gibb & Partners have been appointed in connection with the civil engineering works.

Mr. Harold Hobson, former chairman of the Central Electricity Board, is expected home from Canada next Tuesday. It was reported in the *Evening News* of October 20th that Mr. Hobson may become chairman of the Hydro-Electric Power Commission of Ontario.

Mr. T. R. Smith, A.M.I.E.E., has been elected president of the North Wales Society of Engineers and in his presidential address discussed hydro-electric power with particular reference to North Wales. He mentioned the difficulties of securing suitable high level storage areas other than those employing the flow of a great river or tidal flow. In North and Central Wales only about 656 million kWh could be made available from water power.

Mr. T. G. Procter has been appointed chief electrical engineer to the Auckland Harbour Board, New Zealand, in succession to **Mr. S. Edwards,** who has retired. The *Electrical Engineer & Merchandiser* reports that before joining the Harbour Board last year Mr. Procter was with the British Thomson-Houston Co., Ltd., at Rugby.

Mr. Vivian T. Norman, A.C.A., has been elected to the board of the Coventry Gauge & Tool Co., Ltd., as director and commercial manager.

Following a staff reorganization the following appointments have been made by Central Sussex Electricity, Ltd., and associated companies:—Mr. H. Dixon, M.I.E.E., to be chief engineer, and joint general manager; Mr. A. M. Harker, M.A., F.C.C.S., to be secretary and joint general manager; Mr. A. Barnes, A.M.I.E.E., to be chief assistant engineer; Mr. F. P. Meadows, B.Sc., A.M.I.E.E., to be technical engineer; Mr. G. W. Else to be maintenance engineer; Mr. R. M. Simmonds to be personal assistant to the joint general managers; and Mr. L. Fortescue, A.C.C.S., to be chief commercial assistant.

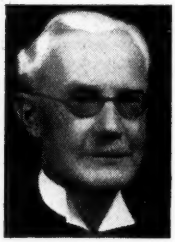
Mr. F. T. Davies, for eighteen years clerk and treasurer to the Stalybridge, Hyde, Mossley and Dukinfield Transport and Electricity Board, is retiring on December 31st. His deputy **Mr. Edgar Butterworth,** A.S.A.A., succeeds him. Since 1944 Mr. Davies has also been acting transport manager to the Board and on his retirement **Mr. L. G. Stockwell,** M.I.Mech.E., rolling stock superintendent, will become transport manager.

The Northmet Players (Northmet Electric Power Co.), are to be congratulated on the presentation on October 16th, 17th and 18th at the Church House, Southgate, N.14, of "Current Events," a very bright revue, with music, lyrics and sketches written by Norman Axford, a member of the staff. Naturally the sketches and the lyrics all related to Northmet life, and

good-humoured fun was poked at all sections, from the board of directors down to the telephone operator. The musical numbers were tuneful and the dancing of the "Northmet Sparklets" was much to the taste of the audiences which filled the hall on each night. The settings were well executed, particularly in two ballet scenes, and the lighting effects were used with artistry. The performances went with a swing which indicated the excellent work of the many helpers behind the scenes.

Obituary

Sir Leonard Pearce.—It is with the greatest regret that we report the death, on Monday last, of Sir Leonard Pearce, engineer-in-chief and a director of the London Power Co. Standen Leonard Pearce was born in 1873 at Crewkerne, Somerset, and after education at Bishop's Stortford College and Finsbury Technical College he served an apprenticeship with the Electrical Engineering Co., West Drayton, and Thos. Richardson, Hartlepool. His first appointment was as assistant engineer with the British India Steam Navigation Co., Calcutta, and he subsequently served with the Metropolitan Electric Supply Co., the British Thomson-Houston Co. and the Central London Railway.



The late Sir Leonard Pearce

In 1901 he was appointed deputy chief electrical engineer in the Manchester Electricity Department and in 1904 became chief of the department, a position which he held until 1925, when he was appointed an Electricity Commissioner. In the following year he went to the London Power Co. as engineer-in-chief, and while still retaining that position again acted as a part-time Electricity Commissioner from 1940 to 1945. He was responsible for the Barton generating station, Manchester, and for the engineering design and operation of the Battersea station. He was awarded the C.B.E. in 1919 and received his knighthood in 1935.

Sir Leonard was a member of the three principal engineering Institutions and a Doctor of Science. He joined the I.E.E. in 1898 as an associate and became an associate member in 1901 and a member in 1904. He had served as a member of the Council and was vice-president in 1920. In January last his services to electrical engineering were recognized by the award of the Faraday Medal. Sir Leonard was also a past-president of the Manchester Section of the Institution of Civil Engineers, the Incorporated Municipal Electrical Association and the Junior Institution of Engineers.

Mr. C. A. Baker.—The death, on October 16th, is reported from Bournemouth of Mr. Charles Alfred Baker at the age of seventy-nine. Mr. Baker was in charge of the Electrical Division of the L.C.C. Engineers' Department for over twenty-six years, retiring in 1933. He was trained at the Hanover Square School of Engineering and in the workshops of Swete & Maine and was later assistant engineer in the Milan station of the Italian Edison Co., then the largest in Europe. In 1898 he went to St. Petersburg (Leningrad) in charge of a £250,000 cable contract and upon his return to this country acted as joint engineer to the syndicate promoting the Yorkshire Electric Power Bill and as sole engineer in connection with the Shropshire, Worcestershire and Staffordshire Electric Power Bill.

Mr. Baker joined the London County Council in 1906 and during his service was responsible for all the Council's electric lighting work, the complete electrical equipment for the County Hall and the conversion of the main drainage pumping station at Abbey Mills from steam to electric drive. He was an occasional contributor to the *Electrical Review* and acted as our special correspondent at the International Electrical Congress in Italy in 1927. He joined the Institution of Electrical Engineers (then the Society of Telegraph Engineers) as a student in 1886 and became an associate member in 1889 and a member in 1898.

Mr. E. E. Jolly.—We regret to report the death last Friday in hospital after a short illness of Mr. E. E. Jolly, M.I.E.E., who had been electrical engineer and manager at Bethnal Green since the end of 1935. He was fifty-two. Mr. Jolly received his electrical training at University College, Southampton, and with the Southampton Electricity Department, and afterwards joined the Southampton undertaking. Subsequently he held appointments in the St. Helens undertaking and and in 1932 he went to Ilford as deputy borough electrical engineer and and manager, leaving there to become chief electrical engineer with the Bethnal Green Council. He took a leading part in the reorganization of plant, e.h.v. and l.v. switchboards and distribution systems, with change-over, at St. Helens and Ilford and while with the latter undertaking played an important part in the development of the undertaking, particularly in the progress of domestic electrification, including the installation of many thousands of electric cookers. During the 1914-18 war he served with the R.F.C., attaining the rank of flight-commander.

The late Mr. E. E. Jolly

Ontario's Industrial Growth

Greater Demands on Hydro-Electric Commission

PREDOMINANTLY an agricultural province, Ontario was called upon during the war to produce large quantities of munitions and other war materials. It was expected that with the cessation of these activities the demands on the Hydro-Electric Power Commission would fall, but instead the improved manufacturing facilities have led to further expansion.

In its 386-page report for 1946 the Commission, dealing with this aspect, says that the intense wartime production, especially in the Southern Ontario system, has resulted in the creation of industries manufacturing products not hitherto attempted in the province. This phase of the present industrial growth, fostered by new skills acquired during the war, is considered to be of far-reaching importance.

There is a noteworthy trend to the establishment of industries in suburban areas, particularly plastics, chemicals, building products, rubber, electrical appliances and agricultural machinery. Branch factories of British concerns are being set up in many municipalities. Well-established industries such as chemicals, electro-smelting and furnaces are increasing to capacities greater than during the war, and the cement industry is working to full capacity. There is, too, a marked activity in the search for new gold mines in Northern Ontario, while the production of base metals and non-metallic minerals is increasing. A very large demand is being experienced for the output of pulp and paper mills, and kraft pulp mills are being established in conjunction with saw-mills so that more of the scrap can be manufactured into pulp.

Rural Service

Side by side with this industrial progress, the Commission's rural electrical service has been rapidly extended. This is demonstrated by the fact that last year the number of rural consumers increased by 18,230 to 177,605. The average monthly peak load of all the rural consumers amounted to 139,818 h.p., an increase of 26 per cent over 1945. The Commission's plans call for the construction of 1,500 miles of line this year and capital expenditure approved for extensions amounts to $62·3 million of which half is met by Government grant. A uniform rural tariff introduced in 1944 consists of a first block of kWh at 3·5 cents gross per kWh, a second block at 1·6 cents and all remaining consumption at 0·75 cent per kWh.

The total peak load during the year was 2,625,000 h.p., exceeding the previous year's record figure by 17,000 h.p. Energy production aggregated 12,672 million kWh, an increase of 184 million kWh (1·5 per cent), although the output for primary power purposes showed a reduction in consequence of labour disputes during part of the year. To augment the generating capacity of the Southern Ontario system preliminary work was commenced on the Des Joachims development on the Ottawa River 136 miles from the capital. This will be larger than any of the Commission's plants except Queenston, and will have an initial capacity of 360,000 h.p. in six units, which may be increased later to 480,000 h.p. (eight units). The plant, which will operate under a head of 130 ft, is expected to be in operation during 1950. The cost of the initial development, including $24 million for transmission lines, is $175 million. In the Eastern Ontario division a second major project on the Madawaska river at Stewartville will have a capacity of 81,000 h.p. in three units operating under a head of 150 ft. In the Niagara division a second 70,000-h.p. unit was scheduled for completion last month at De Cew Falls, where the operating head has been increased from 265 to 280 ft. For the Thunder Bay system a site near the mouth of the Aguasabon river is being developed; the capacity will be 53,000 h.p., operating under a head of 290 ft.

Large Frequency Change

Another important undertaking has been the provision of a frequency-changer station at Scarborough to integrate the Commission's systems. The first 25,000-kVA frequency changer is under construction and another has been ordered. An interim report on the conversion of the frequency in the Niagara division from 25 to 60 cycles expressed the view that there were no insurmountable engineering difficulties and there would be marked advantages; the problem was whether these warranted the considerable expense and the diversion of skilled labour involved in converting 1,000,000 kW of power.

The year witnessed a marked expansion in the Commission's research, testing and inspection activities. Matters of particular interest in this field were the application of an echo-ranging device of the radar type for locating line faults and a similar device for detecting cracks in massive concrete structures. A new method of domestic water heating involves the use of an improved type of strap-on heater two of which are used per tank.

The year's operations brought an aggregate income of $58,170,000, with a net balance after meeting all charges of $3,250,000. Since the close of the year Dr. T. H. Hogg has retired from the chairmanship of the Commission, although continuing to serve as consulting engineer, and the report is signed by the Hon. G. H. Challies as vice-chairman.

District Heating in London

Mr. S. B. Donkin's Proposals

AT a meeting of the Common Council of the City of London last week a report by Mr. S. B. Donkin on district heating for the rebuilt areas of the City was referred to a committee. The most suitable system is considered to be the heat-electric, using exhaust steam from turbines generating electricity in stations outside the City boundary. The area under consideration is 360 acres, of which 250 net acres would be covered by new premises. Combined heat and electric generating sets would be installed in the stations, from which hot water would be transmitted by substations in the City containing hot-water accumulators.

The quantity of water circulated to meet a demand of 2·5 B.Th.U. per cu ft per hr with external and internal temperatures of 30 and 65 deg F is based on a flow temperature of 200 deg F and a return temperature of 120 deg. Half of the buildings are assumed to be heated by radiators with a drop of 40 deg and half by panel coils with a drop of 20 deg, and 5 gal. of hot water at 130 deg for each twelve hours would be required for each of the 60,000 day inhabitants, including consumption in restaurants and canteens, with a 30 per cent heat loss for tap water inside the buildings.

Required Plant Capacity

It is assumed that 50 net acres would be catered for with equal heat increments every five years up to 1962, and that the whole 250 acres would be completed in 1977. The maximum heat demand would increase from 264 million B.Th.U. per hr (including 45 million for hot-water supply) in 1952 to 1,320 million B.Th.U. (including 225 million for hot water) in 1977. Plant capacity required without stand-by would be: in 1952, 132 million B.Th.U. per hr of exhaust-steam and 12,000 kW of electricity generators; in 1962, 396 million B.Th.U. and 36,000 kW; in 1977, 660 million B.Th.U. and 60,000 kW. Allowing for pumping and auxiliaries, 5·4 million therms per annum and 42 million kWh would be sent out in 1952 and 27 million therms and 210 million kWh in 1977. The back-pressure turbines would be designed for steam conditions of 900 lb per sq in. (gauge) and 850 deg F and to exhaust at 6 lb per sq in. (absolute). Heat pumps and electrode boilers may be used at a later date.

The new Bankside station of the City of London Co., 0·7 mile from the centre of the load, will be the most advantageously situated and could provide accommodation for three 12,000-kW sets. For the first fifteen-year period, however, it is regarded only as a preferable alternative site to that of the old City Road station of the County of London Co. (four 6,000-kW sets and 0·8 miles away) and the Whiston Road station of Shoreditch Corporation (three 12,000-kW sets and 1·6 miles away), the latter being required in 1957.

Disposal of Electricity

For the electricity generated the Central Electricity Board would pay £2 12s. per annum per kW of demand between 7 a.m. and 7 p.m. on weekdays and for shorter periods during week-ends. The running charge would be 0·32d. per kWh from 7 a.m. to 7 p.m. and 0·16d. from 7 p.m. to 7 a.m. based on coal of 11,000 B.Th.U. per lb at 50s. per ton. An overall combined thermal efficiency of 80 per cent is expected.

One 7-ft (internal diameter) cast-iron tunnel for carrying the 16-in. flow and transmission mains would be run from City Road and another later from Shoreditch. Annual losses from the distribution system (including accumulators) are calculated to be 540,000 therms in 1952, reaching 1,620,000 therms ten years later.

Capital expenditure by 1962 would amount to £4·7 million, including £1,750,000 for generating station plant and pumps, and would ultimately (1977) reach £7·1 million. Corresponding capital charges would be £250,000 in 1962 and £370,000 in 1977, and working costs £404,000 and £655,000. Revenue from the sale of 126 million kWh and 210 million kWh would amount to £235,000 and £392,000. The annual net expenditure could be met and a reserve of £85,000 provided by 1962 by charging an average price to consumers of 8d. per therm with coal of 11,500 B.Th.U. at 55s. per ton. A two-part tariff is recommended. The amount of coal saved by the adoption of district heating as compared with central heating is estimated to reach 103,000 tons by 1977.

Two New Films

Merits and Blemishes

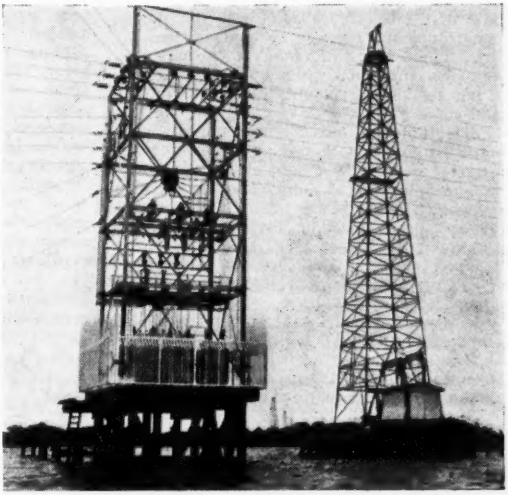
ON Friday last week we participated in "pre-views" of two new electrical films. The first, "Prelude to Prosperity," was made for the Central Electricity Board by the Film Producers' Guild with the intention of securing its exhibition in public cinemas in the ordinary way but as this subsequently proved impracticable, distribution to special audiences is being undertaken by the British Electrical Development Association. Primarily the film is intended to tell the story of the grid but it deals first with the origins of electricity supply in this country, introducing some of the pioneers, and throughout it traces the advance of electricity to the most important position in the country's economic life. The excessive demand upon inadequate plant has necessitated the pointing of a moral which, we believe, was not the film's original intention—that at the moment economy in use is imperative although there is a promise of abundance in the future.

The production of the film has been well done; some of the shots of the grid and the stations feeding into it are excellent. The entertainment value is high but its length (it runs for about forty - five minutes) was against its acceptance for inclusion in the public cinema programme. In any event there are certain sequences which might be sacrified without spoiling the film, e.g., a discussion on the relative merits of d.c. and a.c. between Ferranti, Crompton and Kapp at the Society of Telegraph Engineers, later the Institute [*sic*] of Electrical Engineers which will interest engineers but be considered rather academic by laymen. The occasional intrusion of two voices (a sort of Greek chorus) questioning and answering in doggerel verse is apt to be tiresome. But in spite of its failings there is sufficient in the film to make it entertaining and instructive and no doubt E.D.A. will receive many requests for it. There is also a possibility that the Dominions may like to see a record of British pioneering work which shows this country's ability to surmount great difficulties.

The other "release"—a Ministry of Fuel "short" entitled "Report on Electricity"—is designed for inclusion in cinema programmes and is being shown at 3,000 theatres. Its aim is to explain the gap between electrical demand and supply and to illustrate the efforts which are being made to close it. There are some interesting shots of some of the new stations and nasty things are said about the electric fire—a boon and a blessing gone wrong. Again the commentary is not right; this time dullness supplants pseudo-dramatics. And was it the Severn Barrage Mr. Bernard Shaw advocated or the harnessing of the tides in the North of Scotland? The Crown Film Unit has succeeded in getting a great deal into a reasonable length of celluloid in the remarkably short time of four weeks.

Oil Under a Lake

A VERY rich oilfield has been discovered under Lake Maracaibo in Western Venezuela and the company now operating it is producing an average of 60,000 barrels a day. An electrical system has been installed with great difficulty for most of the towers and substations had to be in the lake itself. Near the bottom of a double pole carrying both 33-kV and 2·3-kV lines there is a bank of three 50-kVA



Substation in Lake Maracaibo

2,300/400-V step-down transformers. We are indebted to the *Electrical World* for the accompanying picture of one of the nine substations in the system. Each has three 500-kVA, 33/2·3-kV transformers to step down the voltage for transmission to distribution transformer banks and pumping operations.

Scientific and Technical Books

A condensed list of the books on science and technology which it has published is available from the Oxford University Press, Amen House, Warwick Square, London, E.C.4. It contains the titles of a number of works on electrical and physical subjects.

Switchgear Developments

Guarding Against Over-Refinement

SOME examples of old switchgear were compared with their modern counterparts by MR. J. B. GWYNNE LEWIS (George Ellison, Ltd.) in his address as chairman of the Western Centre of the Institution of Electrical Engineers, together with DR. E. H. NORGROVE who showed lantern slides and certain demonstration gear to emphasize the influence of speed of break, arc control and power factor on circuit interruption.

The historical aspect of the subject was stressed because lessons from the past could often help to solve present difficulties and were salutary warnings against too great a pride in modernity. One must guard against the assumption that because something was new it must *ipso facto* be good; conversely all old things were not useless.

The series of lantern slides was chosen to show that breaking capacity was the fundamental difference between old and new switchgear. Fault interrupting MVA capacity was apt to be considered without full appreciation of the significance of the amount of power involved.

For instance, a mixed traffic railway locomotive hauling a 400-ton load at 50 m.p.h. on a straight and level track and accelerating at its optimum rate, exerted a draw-bar pull of 1,000 h.p., which corresponded to 1 MVA at 0·8 p.f. and approximated to the power that had to be interrupted when a 200 kVA transformer of 5 per cent inductive reactance (deriving its input from a large system) was feeding its output into a solid fault.

Mr. Lewis pleaded for minimization of complication of any kind, electrical or mechanical, for he believed it was possible for too much refinement to render the product less useful for fulfilling its purpose than the equivalent without any refinement at all.

Installation Matters

Need for Simplified Version of Regulations

SOME personal views and comments were expressed by MR. R. H. RAWLL (borough electrical engineer, Shoreditch) in his address on October 16th as chairman of the Installations Section of the Institution of Electrical Engineers.

By comparison with the twenty-one original Wiring Rules, the form of the present, eleventh, edition of the Regulations was considered to have many disadvantages. Mr. Rawll therefore repeated his advocacy of a set of regulations setting forth in simple terms the basic principles to be observed in installation work which, by their very nature, would not need to be amended or added to for many years. These should be accompanied by an additional comprehensive and detailed code of good practice that could be revised as experience and development dictated, together with a positive educational effort by the I.E.E. to explain the purport of and reasons for the Regulations.

The industry had waited long for a standard all-purpose socket-outlet with a fused plug. Now that a B.S. specification had been issued Mr. Rawll hoped that by the time the housing programme really got going this accessory would be available in sufficient quantities. Insistence upon the comprehensiveness and sufficiency of socket-outlets in houses and flats now being, or to be, erected should engage the industry's continual and urgent attention.

The step recently taken towards the establishment of a "testing house" for adjudicating upon appliances which were the subject of complaint was considered by Mr. Rawll to be very satisfactory. An important constructive aspect of the proposal was that makers whose products had undesirable features would be given the opportunity of receiving advice upon methods of remedying defects.

In the present restricted circumstances the amount of electricity consumed for street lighting could not exceed half that prevailing before the war, which was only 1·82 per cent of the total sold for all purposes. The additional amount of coal needed to restore pre-war standards of public illumination and hours of use would be very small. Good street lighting reduced traffic accidents and discouraged crime. On balance, therefore, there appeared to Mr. Rawll to be every justification in the best interests of the community as a whole for an immediate return to at least pre-war standards of illumination in public thoroughfares. The little extra cheerfulness would indirectly pay dividends in raising national morale out of all proportion to the small cost involved.

Occupational Training

MORE than 200 persons recently attended the Social Centre at the Chelmsford Works of Crompton Parkinson, Ltd., for the annual prize-giving and parents' day of the Occupational Training Scheme. The function opened with an informal reception during which boys introduced their parents to lecturers, foremen and principals of the company. Tea followed, after which Mr. E. H. L. Cooper, general manager of the Chelmsford Works, took the chair for the prize-giving ceremony. The works education officer, Mr. R. M. Edyvean, said there were now 147 boys in the scheme and all boys up to the age of eighteen were now being released for one whole-day per week. Prizes and certificates of training were presented by Dr. B. E. Lawrence, County Education Officer, who commended the company's initiative and stressed the importance of securing the boys' co-operation.

The Cromptonian Association Scholarship was presented to departmental apprentice A. F. Whymark by Mr. T. H. Windibank, works' director, who stated that this country had become great by industry and would regain its place among nations by industry alone.

COMMERCE and INDUSTRY

Plumber Jointers' Agreement. Heating Ban Withdrawn.

AT a meeting of the Joint Industrial Council for the Electrical Cable Making Industry on October 15th the Council adopted an agreement for the reduction of the normal working week of plumber jointers and plumber jointers' mates, engaged on work carried out directly by cable makers, from 47 to 44 hours. Under the agreement the weekly rates of wages for the shorter working week will approximate to those paid for a 47-hour week. Adjustment to compensate for the reduction of working hours will be made by increasing the war bonus for fully qualified plumber jointers of 9d. per hour in the London area, by 2½d. per hour, and of 8d. per hour in the country by 2d. per hour, the resulting inclusive hourly rates being respectively, 2s. 11½d. in the London area and 2s. 7¾d. throughout the rest of the country. The wage rates for fully experienced plumber jointers' mates will be maintained at 85 per cent of those for plumber jointers, but in no circumstances will they be less than the appropriate rate for a labourer in the civil engineering industry. The shorter working week will be worked over 5½ or 5 days, according to the circumstances of the work from time to time.

Electrical Contracting Agreements

Copies are now available of the 1947 edition of the booklet " Electrical Contracting Industry. Industrial Agreements and National Working Rules as agreed between the National Federated Electrical Association and the Electrical Trades Union." The booklet can be obtained from the National Federated Electrical Association, Africa House, Kingsway, W.C.2, at the price of 1s. 6d., post free. It comprises 80 pages and gives full details of current wages and agreements; a schedule of wage rates payable since September, 1939; and sections dealing with zoning, wages, working conditions (including the National Working Rules) and labour under 21 agreements, and it is fully indexed.

Reyrolle Strike Ended

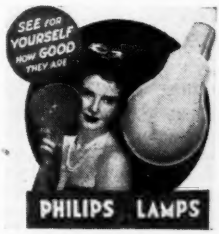
About 1,000 time workers and 3,000 piece workers at A. Reyrolle & Co.'s works at Hebburn-on-Tyne returned to work on October 16th after a week's strike. The stoppage, which was contrary to union instructions, was caused by a claim by time workers for a bonus. The time workers stated that their claim was originally made about eighteen months ago. The company in a further statement on the stoppage said that it was its policy to extend payment by results wherever possible, whatever the labour concerned and whether or not it was employed on direct production. In pursuance of this policy, the company had recently introduced such schemes in various sections formerly on time work. Further action on these lines was under discussion when the strike occurred, and negotiations on the matter had been stopped by the strike. The matter would be reopened when the strike ended. Some of the time workers found when they drew their pay that they had been granted a bonus, although they stated they had had no previous knowledge that they were to get a bonus. The 3,000 piece workers who had been on a " sit down " strike stopped work as a protest against the use of what they termed " blackleg " labour in place of the time workers on strike.

E.I.B.A. Year Book

The Electrical Industries Benevolent Association has issued its Year Book for 1947. This contains the annual report of the Council and the accounts of the Association for 1946, the names and addresses of officers and a list of hon. secretaries of regional and branch committees with their addresses.

Lamp Publicity

The lamp display material of Philips Electrical, Ltd., for the 1947 48 season includes several items for the use of dealers. Of the many sales aids three are new. The first is a centre-piece in colour photography standing 3 ft 6 in. high, intended for window display only. It depicts a young lady holding a hand mirror; there is also an electric lamp and the caption reads: " See for yourself how good they are." The second is an aluminium showcard which is a companion piece to the one used last year, but of an entirely new design. The third is a new cut-out for counter or window display which can be seen at its best with the light above and behind it, thus giving it a three-dimensional appearance. The poster campaign will be run on much the same scale as last year.



Philips centre-piece window display

To meet the increasing need for literature on fluorescent lighting, there is available the A.162 80-W fluorescent fittings leaflet, and a new one in production, A.163, dealing with the new range of Philips fluorescent industrial lighting fittings. There is also a separate list of prices of all lamps, control gear and fittings. A series of Press advertisements will deal with the

40-W MCF/U one- and two-lamp fittings, and another series for lamps generally which will embrace tungsten, MCF/U and discharge lamps.

Heating Ban Lifted

The ban on the use of fuel for heating industrial premises and non-industrial premises, shops, offices, etc., was raised on Sunday last. The decision was taken by the new Fuel Minister, Mr. Gaitskell, " in view of the colder weather." In non-industrial premises, including hotels and blocks of flats, it is still forbidden to start or stoke central heating and hot water plants between 9.30 p.m. and 6.30 a.m. The announcement was accompanied by an appeal for the utmost economy of use.

Jointers' Instructional Books

A series of technical booklets entitled " Electrical Knowledge as an Aid to Craftsmanship in Cable Jointing " is being produced by Dussek Bitumen & Taroleum, Ltd., Empress Wharf, Bromley-by-Bow, London, E.3. Circulation is restricted to electricity supply undertakings and those which conduct jointers' schools have found Part I, which appeared a year ago, of use in classroom support of theoretical lectures and practical work. In Part II, which is now available, an endeavour has been made to indicate how important this kind of work has become and the responsibility which devolves upon the jointer. These booklets refer to the behaviour of a.c. in, and its effects upon, insulating compounds with some explanation of the causes of breakdown. The second is a continuation, and intentionally repeats some of the subject matter, of the first in order to renew interest and carry the reader beyond the mere mechanical making of a cable joint.

National Plumbing Studentships

The establishment of four national plumbing studentships (material producers' awards) is announced by the Plumbing Trades National Apprenticeship Council. The studentships have been made possible by the generosity of eleven development and trade associations which between them are providing the necessary funds. It is hoped that four awards of £50 each, allocated to areas in England and Wales and Scotland, will be offered for competition annually. The awards are open to candidates up to the age of twenty-six years who have passed the final examination of the City and Guilds Institute in plumbing and have served an approved apprenticeship. The object is to encourage promising men to become acquainted with techniques other than those with which they are familiar and to enable them to spend three to four weeks visiting manufacturers' works and noteworthy plumbing installations.

Applications for the first awards must be submitted before January 1st, 1948. Full particulars, together with application forms can be obtained from Mr. H. W. Mole, hon secretary, Plumbing Trades National Apprenticeship Council, L.C.C. Hammersmith School of Building and Arts and Crafts, Lime Grove, Shepherd's Bush, W.12.

Quarry Electrical Equipment

The Minister of Fuel and Power draws attention to the provisions of the Quarries General Regulations (Electricity) (Exemption) Order, 1947, S.R. & O. 1947 No. 1220, and the Metalliferous Mines Regulations (Exemption) Order, 1947, S.R. & O. 1947, No. 1219. The former exempts all quarries in which electric power is used from the necessity to comply by July, 1947, with the requirements of the General Regulations of 1938, relating to the construction of cables and other apparatus in use before July, 1938. The latter gives similar exemption for cables and other apparatus in use on the surface of metalliferous mines before July, 1938. Under these Orders, which have been made because of the difficult supply position of cables and other electrical apparatus, the exemptions continue in force for an indefinite period, and when the supply position justifies their termination the Minister will give adequate notice. In the meantime, however, Inspectors of Mines and Quarries are being instructed to examine individual cases where compliance with the 1938 standards is practicable and to require compliance, the Minister having power under Defence Regulations to deal with such cases.

Electricity Loans

During the six months ended September 30th last the Electricity Commissioners sanctioned the borrowing of £54,178,099 by public authorities in connection with electricity supply. This compares with £43,978,594 for the whole of the year 1946-47, £37,652,375 for 1945-46 and £28,337,818 for 1944-45. The principal item is generating plant (£29,626,722 against £19,239,336 in 1946-47), the necessary buildings accounting for an additional £9,947,373 (£6,799,906). Distribution plant calls for £6,147,676, as compared with £4,854,982 for 1946-47. Mains and services are down for £6,386,516 (against £8,299,475 in 1946-47). No loans were sanctioned for the Central Electricity Board.

" Safety in the Home " Exhibition

A " Safety in the Home" Exhibition, believed to be the first of its kind in the country, was held recently by the Birmingham Accident Prevention Council. The City of Birmingham Electric Supply Department co-operated by staging an exhibition of the causes and means of preventing electrical accidents in the home. Three panels constituted the background of the stand, the centre panel dealing with the causes of domestic electrical accidents in a general manner. One of the supporting panels drew attention to the

importance of adequate and correctly placed lighting by means of a suitably equipped model kitchen. The danger of amateur wiring extensions and the misuse of plug adaptors was demonstrated on the third panel where an initially sound installation had been rendered unsafe by "amateurish tinkering." Actual specimens of faulty wiring, home-made adaptors, etc., which had been brought to light by the Department's inspectors were also displayed, and methods of ensuring maximum safety against fire risks with electric fires were suggested.

National Safety Congress

Delegates from firms in a wide range of industries were present at the industrial sessions of the Silver Jubilee National Safety Congress organized by the Royal Society for the Prevention of Accidents, and held at Brighton and Hove, from October 6th to 10th. Subjects of papers presented included "Industrial Safety Methods in America," "Training Supervisors in Safety Methods," "Noise Abatement in Industry," "The Factory Floor and Personal Safety" and "Guarding of Milling Machines."

Asdics for Herring Location

Following recent experiments carried out at the request of the Ministry of Agriculture and Fisheries the Admiralty states that the asdic will indicate the presence of herring shoals under favourable weather conditions, particularly in the upper layers, but a skilful operator is required to pick out the appropriate echoes. It is doubtful, however, whether it will be of commercial value if fitted in vessels of the herring fleet. It may have some value in a special ship, such as a fishery or research vessel, for locating the best fishing grounds.

E.W.F. Members

The Electrical Wholesalers' Federation has issued its 1947 edition of members. This is divided into two sections, one being an alphabetical list of members, and the other giving their names under towns.

B.S. for Electronic-Valve Bases

A revised edition of B.S. 448, "Electronic-Valve Bases, Caps and Valves" (7s. 6d., post free from the British Standards Institution) includes many types that have been introduced since the earlier editions were issued in 1932 and 1936. The first section of B.S. 448: 1947 deals with bases and holders in general. Subsequent sections cover dimensions and gauges of bases for a number of types.

Welding Goggles

The revised edition of BS. 679 is now available. It deals with protective filters for welding and other industrial operations, for safeguarding the operator's eyes against ultra-violet and infra-red rays, total heat and glare. In addition to the requirements specified for the various grades and shades, provision is made for ensuring uniformity when filters are employed in pairs for goggles. An appendix contains a complete list of the different uses for which the several grades are recommended. The document is obtainable for 2s. from the British Standards Institution, 24, Victoria Street, London, S.W.1.

Midland Radio Ball

The Radio Industries Ball (Midlands) arranged by the Radio Industries Club of the Midlands is to be held at the Grand Hotel, Birmingham, on November 24th. A buffet supper will be provided and Vernon Adcock and his broadcasting band have been engaged. Tickets (17s. 6d. each) may be obtained from Mr. F. A. Croft, General Electric Co., Ltd., Moor Street, Birmingham, and table bookings should be sent to Mr. J. A. Lloyd, Ever Ready Co. (G.B.), Ltd., 19-21, Bath Street, Birmingham.

Royal Visit to Ekco Works

During her visit to Southend-on-Sea on Saturday, the Duchess of Kent visited the Ekco radio, plastic and lighting works at Prittlewell. The Duchess was introduced by the Mayor of Southend to the board and management, and to a man and woman selected by ballot to represent the factory employees. Her Royal Highness saw a special exhibition of the company's newest products and then proceeded through the radio assembly shops to the presses in the plastic division.

Research Station for Scotland

A new Mechanical Engineering Research station to be set up by the Government in Scotland will act as a valuable source of information for the new industries being set up there, as well as to the established ones.

Glasgow Modern Homes Exhibition

Although limited by austerity, Glasgow Corporation's Modern Homes Exhibition at the Kelvin Hall, opened by Lord Provost Sir Hector McNeill, contains a large and interesting display of electric kitchen devices. At the Corporation Electricity Department stand cookers, water heaters, refrigerators, washing machines, and clothes-drying cabinets attracted much attention. The Transport Department has as a centrepiece a diagram of a modern tramcar with animated lights tracing the path of the current from the overhead wire to the rail, the floor space in front being taken up by a working model of a section of a modern town operating an up-to-date transport service. Among other exhibitors are:—G. F. Glen (electric household equipment, dish washing machinery, hoists, etc.); William Levene, Ltd. (lighting equipment); Weldall & Assembly, Ltd. (unit kitchen apparatus); Easiwork, Ltd.; Hoover, Ltd. (cleaners); British Vacuum Cleaner &

Engineering Co., Ltd. (vacuum cleaners, "Teasmade," and "Time Spot" radio); J. & H. Walter, Ltd. (cordless iron); Vactric, Ltd. (vacuum cleaners and floor polisher); L. Sterne & Co. (refrigerating equipment); Electrolux, Ltd. (refrigerators and cleaners); Wm. Kemp & Co. (Refrigeration), Ltd. (refrigerators); A. & C. Edelman (1939), Ltd. (domestic appliances); British Luma Co-operative Electric Lamp Society, Ltd. (fluorescent lamps and fittings); Bryterlite Electrical Co. (Glasgow), Ltd. (lighting, cooking and heating apparatus); Glasgow's Lighthouse, Ltd. (lighting and domestic appliances); National Utilities, Ltd. (vacuum cleaners); Turner & Co., Glasgow (refrigerators, etc.); and Bearston (Kitchen) Products.

World Power Conference

The most important decision of the International Executive Council of the World Power Conference, at its recent meeting at The Hague, was the unanimous acceptance of an invitation from the British National Committee for the Fourth Plenary World Power Conference to be held in London in 1950. In the absence, owing to an indisposition, of Sir Harold Hartley, this invitation was conveyed to the Council by Mr. H. Hobson, in his capacity as vice-chairman of the British National Committee. Mr. Hobson informed the Council that the British Government had promised its full support.

German Plant to be Dismantled

Four electrical engineering works are among a list of 682 industrial plants in the British Zone of Germany which have been declared surplus to the bi-zonal level of industry. They comprise a section of the accumulator manufacturing plant of the Accumulatoren Fabrik A.G., Hanover-Stoeken; and the three gyrocompass factories which are operated by C. Plath, Hamburg-Bahren, Anschutz G.m.b.h., Landesjugdheim-Selent; and Phoenix G.m.b.h., Eutin. The last two have already been allocated for reparations by the Allied Control Commission as have also four surplus power plants, the Anergana G.m.b.h., Gondorf; Toeging, near Mudldorf (part); Grosskraftwerk-Mannheim A.G., Mannheim-Neckarau; and the Hastedt steam power plant, Bremen. Many of the 224 mechanical engineering concerns to be dismantled have been making boiler plant, lifts, conveyors, hoists, fans, blowers, industrial furnaces, etc.

Trade Publications

Simplex Electric Co., Ltd., Broadwell, Oldbury, Birmingham. — Price list (No. 1738) of steel conduit and announcement that switchgear (list No. 1690) has been further advanced in price.

Anti-Attrition Metal Co., Ltd., Woodlands Park, Maidenhead, Berks.—Pamphlet with tabulated data on bearing loads and lubrication.

Loblite, Ltd., Team Valley Trading Estate, Gateshead-on-Tyne, 11.—Leaflet on watertight well-glass lighting fitting.

Spiral Tube & Components Co., Ltd., Osmaston Park Road, Derby.—Leaflet describing "Spirette" unit type air heaters.

Lee Products (Great Britain), Ltd., Radio House, East Street, Brighton.—Priced catalogue (G.7) of radio and electrical appliances and accessories.

Macrome, Ltd., Aldersley, Wolverhampton.—Stock list of Macrome treated drills, reamers, milling cutters, slitting saws, lathe tools, etc.

Trade Announcement

Mr. Frank Porter, who is now technical and sales engineer in Leeds for Crypto, Ltd., has moved from Leicester to 11, King's Road, Bramhope, near Leeds, from which address Porter Electrical Products, Ltd., is also operating.

Trade Marks

AMONG recent applications for the registration of trade marks are the following, objections to which may be entered within a month from October 15th:—

FLEA. No. 647,910. Class 7. Electric motors and internal combustion engines (not for land vehicles) and parts included in Class 7.—Aeronautical & General Instruments, Ltd., Purley Way, Croydon.

MICROMOTE. No. B644,986. Class 9. Circuit breakers.—Pierce Laboratory, Inc., New Jersey. Address for service, c/o Forrester, Ketley & Co., 88/90, Chancery Lane, W.C.2.

OMNIPAC. No. 649,565. Class 9. Radio apparatus, telephone instruments, and electrical apparatus and instruments included in Class 9; and parts, included in Class 9, of all such goods.—Amplivox, Ltd., 2, Bentinck Street, Manchester Square, London, W.1.

COMELCO. No. 650,734. Class 9. Electric control apparatus for fluorescent lamps. No. 650,735. Class 11. Shades and reflectors, all for electric lamps.—Commercial Electric Co., Ltd., 322, Wellington Road North, Stockport.

ACTINEA. No. 650,709. Class 10. Radiant light lamps for curative purposes.—J. Halden & Co., Ltd., Rowsley Works, Reddish, near Stockport.

LUMBEX. No. 651,066. Class 10. Electrically heated pads for surgical and curative purposes, and electrically heated blankets.—Suflex, Ltd., Warrington Works, Randolph Avenue, W.9.

CIRCLINE. No. B649,647. Class 11. Electric lamps included in Class 11.—British Thomson-Houston Co., Ltd., Crown House, Aldwych, London, W.C.2.

RENELEC. No. 649,804. Class 11. Installations for lighting, heating, steam generating, cooking, refrigerating, drying, ventilating, water supply and sanitary purposes, all electrically operated.—Renforts, Ltd., Eagle House, Jermyn Street, London, S.W.1.

Northampton Company's Rating

Successful Appeal Against Assessment

JUDGMENT has been given by the Recorder of Northampton (Mr. Richard Elwes) in an appeal by the Northampton Electric Light & Power Co., Ltd., against an increase in the company's assessment for rates by the local rating authority. Evidence had been given for the company during the hearing of the appeal by Mr. A. R. Craig Hall, chartered surveyor, Mr. H. C. Wells, technical adviser to the County of London E.S. Co. and the company's accountants, and for the Authority by Mr. J. L. Milne, chartered surveyor.

The Recorder, in his judgment, said that it was common ground between the parties that the rateable value of the hereditaments in question must be ascertained upon the profits basis. For the present purpose he had to arrive at a figure to represent the cumulo rateable value plus rates and for this purpose he had to establish from the evidence figures representing gross receipts, working expenses and allowances for repairs, and renewal fund and the tenant's share.

As regards gross receipts, the Authority contended that a substantially lower sum received from the Central Electricity Board should not be allowed to alter the amount originally agreed to by the appellants as a basis. The Recorder accepted this contention and found that the respondents' figure of £881,400 for gross receipts (against the appellants' £865,014) should stand.

Increased Allowance for Coal

Under "working expenses" he could not agree to a reduction in the amount allowed for directors' fees on the ground that the landlord would insist on being represented on the board at his own expense, as his interest was already adequately safeguarded. He accepted the appellants' argument that a greater allowance should be made for the increased price of coal. Although no actual contribution to the employees' benevolent fund was made in the material accounting period such a contribution as an average over five years was a proper deduction. These adjustments increased the working expenses from the respondents' figure of £429,574 to £450,564, leaving £430,816 as the profit on working.

The Recorder thought that the repairs account had been made to carry considerable but unascertained payments on capital account and he reduced the amount under this heading from £63,000 to £40,000. As regarded the renewal fund he allowed the appellants' figure of £140,657 (against the respondents' £93,049); he did not accept the respondents' contention that assets should be written down upon the original value and if replacements cost more the difference should be met by way of additional capital. He accepted generally Mr. Craig Hall's depreciation figures based on the "lives" of various assets with the possible exception of buildings for which allowance was made.

As regarded the tenant's share of the annual profits the parties agreed that it should relate to gross profits and the appellants asked for 10 per cent of the whole. The respondents argued that there should be a reduction to 5 per cent in respect of bulk supplies, "exports" to the Central Board and certain retail sales, but the Recorder thought that they had not made out their case. But after looking into every aspect of the case he thought that there should, in justice, be a marginal correction and accordingly abated the tenant's share from £86,501 as assessed by Mr. Craig Hall (against £77,177 proposed by the respondents) to £80,000.

In the result the appeal was allowed and the cumulo rateable value plus rates was reduced from the Authority's figure of £218,502 to £172,889. The appellants contended that they should be assessed at £127,444.

Home and Factory Power

DURING the next three or four months the public will be able to see a "Home and Factory Power" Exhibition which has been arranged at the Science Museum, South Kensington, by Mr. W. T. O'Dea, B.Sc., A.M.I.E.E. The exhibition, which was opened by Lord Citrine, chairman of the British Electricity Authority, on Tuesday last, has as its object the illustration of the relationship between power in the home and power for industry, and to show how, with reasonable care in the home, there need be the minimum of "austerity" all round. Thus, starting from the fact that 24 persons are employed for every horse-power of marginal load in industry, a model has been constructed in which a workshop employing 24 people is driven by a 1-h.p. motor. Puppet workmen are busily employed until the visitor presses a switch to bring on a one-bar electric fire which is the equivalent of at least one horse-power in terms of domestic load. Immediately the workshop stops and the workers sit down to wait until the fire is switched off again. An illuminated label tells what has been done and at which hours of the day this disastrous result is most likely to happen.

There are several such models, but in addition there is full information, vividly displayed, about the relative importance of various domestic appliances. If, for instance, the visitor learns to take hot baths at night instead of in the morning, it is far more effective than breaking the cleaning routine by economizing on the vacuum cleaner.

Next Week's Events

Monday, October 27th

LONDON.—Savoy Place, W.C.2, 5.30 p.m. Institution of Electrical Engineers. Informal meeting. Discussion on "Standardization in the Electrical Industry," to be opened by the President, Mr. P. Good.

NEWCASTLE-ON-TYNE.—Neville Hall, Westgate Road, 6.15 p.m. I.E.E. North-Eastern Centre. "Standardization of Switchgear," by D. E. Lambert and J. Christie.

BIRMINGHAM.—James Watt Memorial Institute, Great Charles Street, 7 p.m. I.E.E. South Midland Radio Group. "Practical Waveguides," by Dr. L. G. H. Huxley.

WOLVERHAMPTON.—Victoria Hotel, 7 p.m. Electrical Power Engineers' Association (Midland Technical Group). "Modern Illumination Technique," by J. C. Lowson.

NOTTINGHAM.—Corporation Gas Showrooms, Parliament Street, 6.30 p.m. Nottingham Society of Engineers. "Alternating Current or Direct Current, which is your Preference?" by J. E. Brewin and J. F. Driver. (Joint meeting with the I.E.E. East Midland Centre).

SHEFFIELD.—Metallurgical Club, West Street, 7.30 p.m. Junior Institution of Engineers (Sheffield and District Section.) Annual general meeting. Lecture, "Plastics," by W. E. Amies.

Tuesday, October 28th

LEEDS.—Corporation Electricity Showrooms, Whitehall Road, 6.30 p.m. I.E.E. North Midland Installations Group. "Protective Finishing of Electrical Equipment," by F. Widnall and R. Newbound.

MANCHESTER. — Engineers' Club, Albert Square, 6 p.m. I.E.E. North-Western Transmission Group. "Standardization of Power Cables," by W. H. L. Lythgoe.

GLASGOW.—Royal Technical College, George Street, 6.30 p.m. I.E.E. Scottish Centre. "The Application of Electrical Technique to the Service of some other Industries," by H. Cobden Turner and G. M. Tomlin.

RUGBY.—Corporation Electricity Showrooms, 6.45 p.m. I.E.E. Rugby Sub-Centre. "Tooth-Ripple Losses in Unwound Pole-Shoes," by W. J. Gibbs, and "Parasitic Losses in Synchronous-Machine Damper Windings," by Dr. J. H. Walker.

LONDON.—Royal Society of Tropical Medicine and Hygiene, Mansion House, Portland Place, W.1, 7 p.m. Society of Instrument Technology. "The Organization of an Instrument Department in an Industrial Works," by J. O. V. Vick, C. Lamond and W. Lindsay.

COVENTRY.—Butts Pavilion Civic Restaurant. Coventry Electric Club. "New Lamps for Old," by L. J. Davies.

Wednesday, October 29th

SHEFFIELD.—Royal Victoria Station Hotel, 6.15 p.m. I.E.E. Sheffield Sub-Centre. "Comparison between Gas and Electricity on the Basis of Coal Economy," by P. Schiller.

PRESTON.—Harris Institute, 6.45 p.m. I.E.E. North-Western Centre. "Record of Experience on the Irish Electricity Supply System," by A. Burke, R. C. Cuffe, and W. O'Neill.

MANCHESTER.—Engineers' Club, Albert Square, 6.45 p.m. I.E.E. (North-Western Students' Section). "Some Aspects of Railway Electrification," by J. Beasley.

LONDON.—At the Institution of Civil Engineers, Great George Street, S.W.1, 6 p.m. Institute of Welding. Presidential address by J. L. Adam.

LONDON.—Institution of Electrical Engineers (London Students' Section). Visit to the Chelmsford Works of Crompton Parkinson, Ltd.

Thursday, October 30th

LONDON.—Connaught Rooms, 12.55 p.m. Batti-Wallahs' Society. Luncheon. Speaker, Dr. T. E. Allibone.

LEICESTER.—Electricity Offices, Charles Street, 6.45 p.m. Leicester Electrical Society. "The Care and Maintenance of Electric Motors," by R. A. Joseph.

Friday, October 31st

LONDON.—Storey's Gate, St. James's Park, S.W.1, 5.30 p.m. Institution of Mechanical Engineers. Discussion on "The Manufacture of Turbine Blades for the Whittle Engine," by T. A. Kestell.

Saturday, November 1st

LONDON.—Victoria Hall, Bloomsbury Square, W.C.1, 7.30 p.m. I.E.E. (London Students' Section). Autumn dance.

GRAVESEND.—Woodlands Hotel, Wrotham Road, 3 p.m. Electrical Power Engineers' Association (Kent Section). Presidential address by G. O. James.

MANCHESTER.—The Manchester Geographical Society, 16, St. Mary's Parsonage, 2.30 p.m. Junior Institution of Engineers (North-Western Section). "Patents from the Layman's Point of View," by L. H. A. Carr.

L.N.E.R. Electrification Progress

DESPITE shortages of skilled labour and materials, especially steel, progress continues to be made with the Liverpool Street-Fenchurch Street-Shenfield electrification scheme of the L.N.E.R. Most of the heavy engineering work is now completed. The re-arrangement of the track layout at Liverpool Street is planned in five major stages, and is likely to take nearly twelve months.

A fleet of 276 new coaches, forming 32 multiple-unit electric trains of modern design, is to be built. The completion date of the first coach cannot yet be stated but the manufacture of the electrical equipment is well in hand.

ELECTRICITY SUPPLY

Battersea Station Extension. Southend System Developments.

Accrington. — NEW POWER STATION. — The Corporation has been authorized to erect a generating station at Huncoat costing £5,000,000. The Central Electricity Board has brought forward the date for completion of the first half from the winter of 1950 to that of 1949.

Battersea.—FURTHER EXTENSION.—A report submitted to Chelsea Borough Council on Wednesday states that notice of a proposed further extension of the Battersea generating station has been given by the Electricity Commissioners. The proposal is to install one turbo-alternator group with a maximum continuous rating of 100,000 kW, complete with ancillary plant. The report adds that the conditions to be imposed will give as much protection as Chelsea is likely to obtain.

Cardiff.—HIGHER CHARGES.—Because of the probability of a deficiency in the neighbourhood of £70,000 on the current year's working the Electricity Committee has recommended that charges shall be increased next March.

Hackney.—MILLFIELDS ROAD STATION EXTENSION.—The Borough Council has received a direction to extend the Millfields Road generating station by the installation of two 30,000-kW turbo-alternator sets, complete with boilers, coal handling plant, etc., ready for commercial operation in July, 1951. In connection with the scheme a report is to be obtained from Mouchel & Partners, Ltd., on the practicability of reconstructing the weir at Lea Bridge lower down the River Lea.

Hastings.—ONE-THIRD REBATE.—A special "parting gift" before nationalization in the form of a 33⅓ per cent rebate on all next quarter's accounts is proposed by the Electricity Committee. The total cost would be approximately £20,000.

Manchester.—LOAN.—Application is being made by the Corporation to borrow a further £20,000, to meet expenditure during the next twelve months, mainly for the supply of electricity to new houses, and for expected industrial development.

STREET LIGHTING.—For the year ended March 31st last expenditure on public lighting by gas was £105,149, and by electricity £84,158.

Middlesbrough.—OPERATION OF SNOWDON ROAD STATION.—In view of the shortage of generating plant the North-Eastern Electric Supply Co., Ltd., has asked that the generating station at Snowdon Road shall be put into operation from now until February, or possibly March. The Gas and Electricity Committee of the Council has authorized the operation of the plant and the engagement of additional staff.

Morley.—ELECTRICITY SURPLUS PROTEST.—A petition is being presented to the Town Council protesting against its decision to hand over a £4,902 surplus on the town's electricity undertaking "to the Government," maintaining that this money should be paid back to consumers or used for some improvement in the town. At the last Council meeting a recommendation by the Electricity Committee that the balance should be distributed by way of a special discount was rejected by a narrow margin.

Nelson.—LOANS.—The Town Council is applying for sanction to borrow £6,000 for meters, and £8,000 for mains and services.

Norwich.—RADIO COMMUNICATION SYSTEM.—The undertaking has been allocated a waveband for the purpose of a short-wave radio system to be used for maintenance work in its 700-sq mile area.

Rotherham. — DISTRIBUTION SCHEMES. — The undertaking proposes to enlarge the Rockingham Road substation at Swinton at an estimated cost of £1,800; erect a substation in Claypit Lane, Rawmarsh, and lay cables at a cost of £3,000, in connection with a project of the Wholesale Dairies (Rotherham & District), Ltd.; and erect a substation and lay cables at an estimated cost of £6,000 in connection with a project of the Rotherham Co-operative Wholesale Society at Herringthorpe.

Scotland.—GAUR PROJECT.—The North of Scotland Hydro-Electric Board published last week its Gaur Project (Constructional Scheme No. 15) which will utilize Loch Eigheach on the edge of the Moor of Rannoch, Perthshire, for the production of electricity. A dam 45 ft high and 335 ft long will be built at the east end of Loch Eigheach near the bridge which carries the road from Rannoch Station to Kinloch Rannoch over the Allt Chaldar Burn. Additional streams will be diverted into the loch to utilize a catchment area of 93 sq miles with an average rainfall of 69 in. An 800-ft pipe-line will lead water from the loch to a generating station with one 5,000-kW set operating at a gross head of 92 ft. Power will be transmitted at 33 kV to the Grampian Electricity Supply Co.'s existing system, connecting with the Rannoch power station.

Southend-on-Sea. — 33-kV NETWORK. — Because of the growing demands in the area it has been decided to replace the three 33-kV grid supply lines by two 132-kV lines and to provide a firm 60 MVA at a new switching station to be erected at Prittlewell. The bulk supply will then be given at 33 kV in place of 11 kV as at present. A new 33-kV network will be superimposed on the existing 11-kV network and the scheme decided upon will allow for six 33/11-kV major feeding points to be sited at convenient points throughout the borough. The whole scheme is estimated to

cost £525,000 at present prices and the first portion £220,000. The latter sum is made up as follows:—Purchase of C.E.B. land, cables, switchgear and transformers, £44,500; 33-kV cables and pilots, £68,500; 33-kV switchgear and transformers, £87,000; switch-house and control room, £20,000. The Town Council has approved the scheme and application is now being made for loan sanction. The first part of the scheme should be completed and ready to augment the supply at Leigh for the winter load of 1948 followed by an additional feeding point at Eastwood to provide an adequate supply the following year for the new industrial estate being developed in that area. The 33-kV feeders, each having a capacity of 15 MVA, will be operated as transformer feeders, but sufficient land is being obtained now to provide for the installation of switchgear and the operation of the feeders as either ring mains or radial feeders at a future date.

Twickenham.—ALLEGED MISUSE OF ELECTRICITY BY "SQUATTERS."—The Borough Council has received a letter from the Ministry of Works stating that the supply of electricity to huts in Bushey Park had had to be cut off owing to its misuse by the "squatters" in occupation. The huts were wired for lighting only but the circuits had been consistently overloaded by the use of electric fires, grills, etc., which had been connected up in quite unorthodox ways with the result that the fire risk had assumed alarming proportions. The Corporation's information that certain re-wiring work was being undertaken by the Ministry in order that the supply might be restored was incorrect. The Ministry was not a housing authority and regretted that it could not contemplate the execution of that or any other kind of work at that camp. The town clerk has been instructed to prepare a factual statement for submission to the local M.P. and the Ministers concerned.

Willesden.—DANGER SIGNAL.—Under a suggested scheme for fostering economy, gas and electricity consumers who use less than last year would receive a green card with their accounts; those using the same amount would get an orange card. Consumers who used more would find a red card enclosed.

Overseas

France.—COMINES POWER STATION NO. 2.—Construction of the second power station at Comines, France (near the Belgian border), is advanced enough for the installation within the next few weeks of the two boilers in the first section. These will provide steam at 933 deg F to a 53,000-kW, 3,000-r.p.m. turbo-alternator. The alternator will be hydrogen-cooled and directly connected to a 10/150-kV transformer. The coal used will be low-grade, dusty and of low volatility, and will be pulverized and dried in ball mills (one per boiler) with storage between them and the boilers. A similar set is to be installed later.

TRANSPORT

London.—TUBE EXTENSION.—It is expected that the 7-mile extension of the Central London line to Woodford and Newbury Park will be finished by the end of the year.

Sunderland.—RISING COSTS.—Dealing with tramcar operation in his annual report Mr. C. A. Hopkins, general manager and engineer, says that working expenses per mile have now reached the formidable figure of 20·143d., the very severe weather being partly responsible for last year's increase. The balance carried to net revenue account (£10,469) was the lowest for many years. As the estimated cost to the tramways of the latest N.J.I.C. award is £15,000, the need for additional revenue is urgent. During the past year the trams carried 53·1 million passengers and the buses 33·3 million, representing an aggregate increase of nearly 10 million. Electricity consumption per tram-mile was 2·4 kWh, a total of 6·4 million kWh being consumed (average price paid 0·98d. per kWh).

Fuel and Power Industries

A LONG-TERM review of the fuel and power situation in Great Britain, embracing organization, marketing and utilization, has been published by P.E.P. (Political and Economic Planning) at 30s. in a 400-page volume under the title of "The British Fuel and Power Industries."

Changes in ownership and organization are regarded as justifiable only as they assist in solving technical problems. The co-ordination of the associated industries under a national fuel policy is discussed, with emphasis on the importance of rationalizing the prices charged for various grades and qualities of fuel in relation to cost of production and of guiding the consumer in his choice in the national interest. Competition between various fuels has stimulated efficiency in use and should continue. The need is stated for more trained fuel technologists and for more detailed statistics on the consumption and the purposes of fuel and power in different industries. Special sections are devoted to the use of fuel in the production of iron and steel and textiles, and reference is made to the saving in coal possible from further railway electrification. The field for saving in domestic fuel is limited by the former low standard of heating and in new housing heat insulation and appliance efficiency should receive great attention.

Coal forms over 90 per cent of fuel consumed. Greater mechanization in mines, especially of loading and haulage, is urged. Recent coalfield surveys give no grounds for anxiety about supplies in total or as to particular types. District heating could not be economically utilized from existing power stations, but might be practicable in new towns.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Electrical Components, Ltd.—The financial results of this company for the year ended June 30th last were summarized in our issue of October 3rd. In his statement which is issued with the report and accounts, Mr. H. S. Seccombe (chairman) says that the review covers the company's first completed year as a public company. It has continued to enjoy an easy selling market, but the economic crisis now facing the country and the Government's plans for solving it will retard for a time at least the free supply of many articles of domestic use which were becoming more freely available, and proposals to restrict capital expenditure will hold up many schemes in connection with re-housing and town planning. In a few months' time, when the effect of these plans begins to be felt, and capital schemes already commenced are completed, the company can expect a contraction of sales in several departments. During the year F. D. Newcombe & Co., Ltd., and Flinders (Wholesale), Ltd., were acquired.

In a circular to shareholders the company is offering 83,320 ordinary shares of 5s. each at 12s. per share in the proportion of 138 new shares per 1,000 held. The issue is being made to provide additional working capital to finance the growing trade of the company and its subsidiaries. The directors have agreed to subscribe without cost to the company for any portion of the issue not taken up by shareholders.

Oxley Engineering Co., Ltd.—In his statement at the annual meeting in Leeds Mr. H. H. Hollis (chairman) said that so far as the parent organization was concerned their turnover had been increased by approximately 36 per cent and the value of work in hand was about 29 per cent higher than a year earlier. Thomas Dryden & Sons, Ltd., of Preston, one of their subsidiaries, was exceptionally busy on pre-war productions in all departments. The radiators manufactured by that company's electrical department had been in great demand.

The Atlas Electric & General Trust, Ltd., in its accounts for the year ended March 31st last, shows a net revenue of £171,297, compared with £143,395 for the preceding year, after charging £155,540 (£149,596) for taxation. After payment of the preference dividend (no dividend has been paid on the ordinary shares since 1932), £40,000 (£5,359) is transferred to general reserve and £232,453 (£216,656) is carried forward.

The agreement signed in February by the Municipality of Montevideo for the purchase of the tramway undertaking and other assets of the Sociedad Comercial de Montevideo still awaits ratification by the Uruguayan Government. A sum of £1,500,000 is being transferred from capital reserve to write down the book value of the investment in the subsidiary company to something more approaching its residual value under the sale agreement; it is not anticipated that any further such transfers will be required for this purpose.

Murex, Ltd., in its accounts for the year ended June 30th last, shows a consolidated trading profit of £430,404 (against £256,426), plus investment income £1,113 (£13,686) and tax recoverable nil (£119,090). After providing for depreciation, directors' remuneration, £30,000 (nil) for deferred repairs and £92,380 (nil) for taxation there is a balance of £170,947 (against £242,784, to which was added £70,000 profit on sale of shares and investments written off and recovered). Reserves receive £62,500 (£201,500) and the dividend is maintained at 17½ per cent, together with a bonus of 2½ per cent (same). The chairman, Mr. G. P. Joseph, says that the full effect of the company's efforts to build up a strong export organization is not reflected in the past year's figures. The values of export orders received last year were three times those of the preceding twelve months.

Richard Johnson, Clapham & Morris, Ltd., report a net trading profit for the year to June 30th last of £86,423, as compared with £59,363 for the preceding year. General reserve receives £20,000 (against £10,000), and as already announced, the final ordinary dividend is 15 per cent, making 20 per cent for the year (against 15 per cent) with a bonus of 10 per cent (same). The balance carried forward is £6,958 (against £5,879 brought in).

Parsons Marine Steam Turbine Co., Ltd., reports a trading profit and other income for the year ended June 30th last of £128,969 (agsinst £237,414). After providing for depreciation, fees, etc., and £65,500 (£124,750) for current taxation, the net profit was £40,879 (£57,365). It is proposed to pay a final dividend of 11 per cent, again making 15 per cent for the year.

The Delhi Electric Supply & Traction Co., Ltd., is paying a final dividend of 5 per cent, tax free, making 9 per cent for fourteen months to March 1st, 1947.

The Cawnpore Electric Supply Corporation, Ltd., has declared an interim dividend of 4 per cent (unchanged).

Calcutta Electric Supply Corporation, Ltd.—The West Bengal Government has decided to exercise the option to purchase the company. The cost of acquisition is expected to be about 250 million rupees (£18,750,000) and negotiations are in progress with the Central Government for a loan.—*Reuter.*

Associated Insulation Products, Ltd.—Details of the company were published on Tuesday in connection with an application to the Stock Exchange for quotation of the whole of the issued shares. The British Shareholders' Trust is placing 375,000 ordinary shares of 5s. each, part of an issued capital of 1,824,376 shares. The subsidiary and associated companies include the Micanite & Insulators Co., Ltd.

A. Reyrolle & Co., Ltd.—The subscription list opened on Monday for the issue of 800,000 4 per cent cumulative redeemable preference £1 shares at 20s. 6d. closed at 10.30 a.m., the issue having been substantially oversubscribed.

The Altrincham Electric Supply, Ltd., is paying interim dividends of 5 per cent on the ordinary and 10 per cent on the deferred ordinary shares, both the same as last year.

Babcock & Wilcox, Ltd., are maintaining their interim ordinary dividend at 5 per cent, less tax.

The Watford Electric & Manufacturing Co., Ltd., has declared an unchanged interim dividend of 5 per cent.

Stream-Line Filters, Ltd., is paying an interim dividend of 5 per cent (same).

The Rawlplug Co., Ltd., has announced an interim dividend of 10 per cent, the same as last year.

The River Plate Electricity & Other Securities, Corporation, Ltd., is again paying an interim dividend of 3 per cent.

Hopkinsons, Ltd., are raising their interim dividend from 5 to 7½ per cent.

New Companies

Goodmarriott & Hursthouse, Ltd.—Registered October 11th. Capital, £4,000. To acquire the business of an electrical and mechanical engineer and contractor carried on by W. Hursthouse at Nottingham as "Good Marriott & Co." Permanent directors: W. Hursthouse and Mrs. E. A. Hursthouse. Regd. office: 25, Barkergate, Nottingham.

A. & H. Gee (Upminster), Ltd.—Registered September 26th. Capital, £2,000. Radio, television and electrical engineers, manufacturers of, and dealers in, electrical supplies, etc. Permanent directors: H. A. Goldberg and Mrs. A. Goldberg. Regd. office: 85-7, South Street, Romford.

Gaunt (Electronics), Ltd.—Registered September 29th. Capital, £1,000. Electrical, wireless and general engineers, etc. Directors: H. Howarth and Mrs. Beatrice Howarth. Regd. office: 100, Dallas Road, Lancaster.

Blackpool Ignition Co., Ltd.—Registered September 25th. Capital, £5,000. To acquire the business of an automobile general electrical engineer and manufacturer, and wholesale and retail distributor of batteries, etc., carried on by John Mottram as "Blackpool Ignition Company" at Blackpool. J. Mottram is the first director. Regd. office: 23, Caunce Street, Blackpool.

S. C. Rogers (Electrical) Ltd.—Registered September 29th. Capital, £5,000. Electrical, mechanical, motor, radio, television, telephone, radar and marine engineers, etc. Directors: S. C. Rogers and R. L. Rogers. Regd. office: 552, Wimborne Road, Winton, Bournemouth.

A. W. & A. S. Hussey, Ltd.—Registered October 3rd. Capital, £200. Electricians, electrical engineers and contractors, manufacturers of radio, etc. Subscribers: W. Reeves and J. G. Hunter, 44, Rydal Gardens, Whitton Park, Hounslow. Directors: A. W. Hussey and A. S. Hussey. Secretary: L. Durham.

Bankruptcies

C. F. Du Bock, formerly trading as the Bright Electric Co., 55, Ridley Road, Forest Gate, London, E.7, electric lamp distributors.—The above debtor applied for his discharge at the London Bankruptcy Court on October 16th. According to the statement of affairs there were liabilities amounting to £1,101 against assets which were estimated to produce £21, but had realised £8. No dividend had been paid to creditors. Mr. Registrar Kean granted the discharge subject to a suspension of four months.

C. Rodgers, electrical engineer, 16, Howard Road, Pomphlett, Devon.—First meeting, November 4th at 24, Lockyer Street, Plymouth. Public examination November 5th at 4, Elliott Terrace, The Hoe, Plymouth.

B. G. Wright, electrical engineer, 15, Hounsfield Road, Sheffield, trading as Wright's Electrical Co.—Application for discharge to be heard on November 27th at the County Court Hall, Bank Street, Sheffield, 1.

A. E. Starr, electrical and radio engineer, lately carrying on business at 125, Commercial Street, Batley, and formerly at 2, Brewery Lane, Thornhill Lees, Dewsbury, as "Electronic Enterprises."—First and final dividend of 4s. 9¾d. in the £ payable October 28th at the Official Receiver's Office, Hallfield Chambers, 71, Manningham Lane, Bradford.

R. T. Morrison, carrying on business at 82, Lumb Lane, Bradford, electrical engineering contractor.—Application for discharge to be heard on December 5th at the County Court, Manor Row, Bradford.

Liquidations

Tolworth Electricity Co., Ltd.—Winding up voluntarily. Claims to the liquidator, Mr. G. S. Hall, 58, Victoria Street, London, S.W.1, by November 22nd.

Protos Electric Appliances, Ltd.—Meetings of members and creditors on November 27th at 1, Hanover Square, London, W.1, to receive an account of the winding-up by the liquidator, Mr. A. F. De Reya.

STOCKS AND SHARES

THE outstanding feature of Stock Exchange markets is the robust strength shown by British Government securities. Prices have risen by several points during the past three weeks; since, that is to say, the Chancellor of the Exchequer repeated the Government's determination to maintain its cheap money policy, and to regard 2½ per cent as the standard for national credit. This has had a pronounced effect upon the front-rank stocks, without, however, producing any particular reflection in what are called the " blue chips " in the ordinary share lists. Money which, in the general course of events, would have gone into such investments. has recently been diverted towards Consols and similar stocks. Debentures and preferences are naturally assisted by the advance in the Consol market. Stock Exchange business comes spasmodically, and members expect the markets to remain uncertain and sensitive until the autumn Budget is opened in November.

New Issues

Following the recent increase in the authorized capital of A. Reyrolle to £2 millions, came news of the issue of 800,000 4 per cent cumulative redeemable preference shares, offered at 20s. 6d. Subscription lists opened on Monday of this week and closed on the same day. Existing stockholders and employees were given preferential consideration. The yield of practically 4 per cent, on the offered price, is a full 20s., per cent better than the current return on " Old " Consols and compares well with that on other electrical preference shares.

Murex secured heavy over-subscription to its issue of 400,000 four per cent cumulative redeemable preference shares offered at 20s., and a premium was considered certain to become established as soon as the market opened.

The Week's Price Changes

E.M.I. shares, at 17s. 6d., regained 6d. of the previous 3s. loss occasioned by disappointment with the dividend. Other shares in the same group display a dull tendency, with Cossors 19s., Deccas 30s., Pye 21s. 3d. and Scophony at 5s. Among engineering issues, C. A. Parsons have eased to 67s. 6d. and Babcocks to 68s. 3d. Home electricity supply shares remain unmoved, but in the overseas section, Palestine Electrics, at 33s. 9d., are understandably dull. Indian electric issues, on the other hand, are generally firm. Calcutta Trams at 42s. 6d. are 10s. up since a month ago. Cable & Wireless ordinary shows a gain of 5 at 175: the official quotation has been widened to 10 points between selling and buying, pending the outcome of the injunction obtained by Eastern Telegraph preference stockholders against the proposal to pay a 100 per cent tax-free dividend on that company's ordinary stock. Burco 5s. shares have improved further to 28s.

D

Miscellaneous Movements

Prevailing tendencies are well marked by the past week's relative behaviour of ordinary and preference share prices in the electrical equipment market. G.E.C. ordinary has dropped 3s. 9d., to 85s., but the 6½ per cent preference reflects the revival of the gilt-edged market with a rise of 1s. 6d. to 35s. 3d. An improvement of 1s. 3d. in A.E.I. 8 per cent preference, now 42s. 6d., goes against a decline to 76s. 3d. in the ordinary. Henley's 4½ per cent preference are 1s. better at 25s., and Ferranti " sevens " have advanced 1s. 3d. to 33s. 9d. Ordinary shares, where changed, are mostly lower on the week. Crompton Parkinsons are dull at 23s. 6d., and depreciation is shown, among others, by English Electric, 53s. 9d., Ever Ready, 33s. 6d., Johnson & Phillips, 68s. 9d., Reyrolles, 66s. 3d. and B.I.C. at 37s. 3d. Anglo-American Telegraph preferred at 130 is 2½ to the good. International " Tel. and Tel." are 2½ up, at 17½. Hopkinsons rose ½, to 96s. 3d.

Atlas Electric Trust

Atlas Electric & General Trust ordinary shares were standing at 10s. 6d. at the beginning of the year, and have recently risen to 14s. 6d. on the understanding that the sale of the company's Montevideo tramways to the Uruguayan Government will be duly implemented. The agreement was signed in February this year. The company's annual report, out a few days ago, stated that the agreement for the purchase of the tramway undertaking " still awaits the formal ratification of the Uruguayan Government." The Atlas Electric will receive the equivalent of about £1,600,000 for its tramway interest. Atlas earned a profit last year of about 3 per cent on its ordinary capital. Provided this rate of earnings is maintained, and with the £1,600,000 invested to bring in, say, a further 2½ per cent—a conservative estimate—the £1 shares at 14s. 6d. look a reasonable lock-up for future reference.

Brazilian Traction

Maintenance of the Brazilian Traction Light & Power dividend at $2 per share for 1946, evoked a protest from a section of the shareholders on the score of undue conservatism, but was no worse than most people in the market had looked for. Sanguine dividend hopes are generally tempered by reference to the huge capital expenditure projected for the extension of the already wide ramifications. Mention was made at the last meeting of an outlay of $160 millions, to be spread over the next few years. In one department alone, the chairman spoke of 100,000 unsatisfied applications for telephone installations; in another, the generating capacity of the hydro-electric plants was said to be much below requirements At about $28 the shares yield 9 per cent, a return which makes allowances for the factors commonly associated with South American investment.

RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Heat-storage Cooker

A COOKER of the thermal accumulator type is being developed, for export initially, by the Thermolux Division of McDONALD ENGINEERS (KIRKCALDY), LTD., South Street, Leven, Fife. The enamelled body of the cooker, which has

"Thermolux" heat-storage cooker

chromium relief, is 4 ft 2 in. wide and 2 ft deep; the height is 2 ft 11 in. over the hob, above which the main oven projects for another 1 ft 3 in. at one end.

At the other end of the hob is a rapid boiling plate of 112 sq in. area, covered by a heat-insulated hood when not in use. There is also a 48 sq in. 500-W simmering plate with variable control.

The roasting oven has a capacity of 2,688 cu in., measuring 14 in. by 16 in. by 12 in. It houses a concealed interior light actuated by a door switch. There is a subsidiary oven (1,176 cu in. capacity) measuring 12 in. by 14 in. by 7 in., combined with a 1,750-W radiant grill under variable control.

The "normal usage" loading of the cooker is stated to be 600 W. Two cupboards in the lower portion of the body can be replaced by a water heater of 2 to 3 kW with a switch to enable 19 or 38 gallons to be stored hot.

Metal Tumbler Switch

A single-pole tumbler switch of very robust construction is being made by SAVAGE & PARSONS, LTD., Watford, Herts. It is of all-metal design with mica insulation throughout; the obtuse angle shape of the frame enables it to be mounted in almost any position. Covers can be made to special order for flush or wall mounting, or case types, while the switch can be supplied in skeleton form; 5, 10 and 15 A models are available.

Fluorescent Lighting Fittings

Three single-lamp fittings for fluorescent 5-ft, 80-W tubes are announced by EKCO-ENSIGN ELECTRIC, LTD., Southend-on-Sea, Essex.

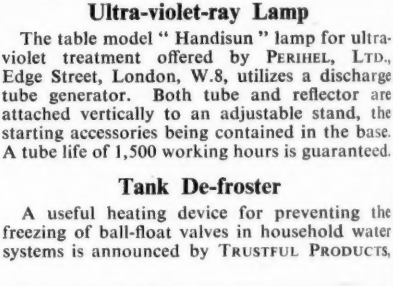
One model for commercial and public buildings has an opal "Perspex" reflector attached to a compact spine. An industrial model has an open top reflector and is made in three detachable parts, which may be assembled in a variety of ways for individual or continuous mounting. The third model has a readily detachable "Perspex" reflector and lightweight spine suspended by chain or conduit, with the ballast box containing the control gear, wired ready for use, fixed directly to the ceiling; an alternative box is available for mounting at a distance.

Ultra-violet-ray Lamp

The table model "Handisun" lamp for ultra-violet treatment offered by PERIHEL, LTD., Edge Street, London, W.8, utilizes a discharge tube generator. Both tube and reflector are attached vertically to an adjustable stand, the starting accessories being contained in the base. A tube life of 1,500 working hours is guaranteed.

Tank De-froster

A useful heating device for preventing the freezing of ball-float valves in household water systems is announced by TRUSTFUL PRODUCTS,



Ball-valve "De-frosta" for water tanks

LTD., 100, St. Martin's Lane, London, W.C.2. It is known as the "De-frosta" and is made in two sizes of 150 W for tanks and 100 W for cisterns, being appropriately shaped to enable it to be simply hooked over the rim of the tank. Provision is made for earthing to the water pipe.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1*s. each*) *may be obtained from the Patent Office*, 25, *Southampton Buildings, London, W.C.*2.

1943

WESTERN Electric Co., Inc.—" Apparatus for generating or amplifying ultra-high frequency electrical energy." 1838. November 12th, 1941. (592972.) " Magnetron apparatus for producing high-frequency electrical oscillations." 13106. May 1st, 1942. (592929.) " Electronic discharge devices for producing ultra-high frequency electrical oscillations." 14383. April 4th, 1941. (592930.)

British Thomson-Houston Co., Ltd.—" Overvoltage protective devices for electric circuits." 7417. May 9th, 1942. (592843.) " Fluid tight seals for electrical apparatus." 7747. May 16th, 1942. (592844.)

Power Jets (Research & Development), Ltd., and W. R. Hawthorne.—" Internal-combustion turbine power plants." 16658. October 11th, 1943. (592883.)

M-O Valve Co., Ltd., and E. C. S. Megaw.—" Magnetrons." 18908. November 12th, 1943. (592931.)

1944

Marconi's Wireless Telegraph Co., Ltd.—" Single pulse electronic relay." 4950. July 30th, 1942. (592792.)

Standard Telephones & Cables, Ltd.—" Telecommunication systems." 6002. April 23rd, 1943. (592846.)

National Cash Register Co.—" Electric impulse responsive apparatus." 9738. May 31st, 1941. (592793.) " Electric impulse responsive apparatus." 9745. April 30th, 1942. (592794.) " Electric impulse producing apparatus." 9746. August 6th, 1942. (592795.) " Communication systems and apparatus." 9747. September 16th, 1942. (592796.) " Communication systems and apparatus." 9748. February 25th, 1943. (592797.) " Electric impulse producing apparatus." 9749. March 3rd, 1943. (592798.) " Counting means comprising electronic devices." 9751. May 6th, 1943. (592799.)

Landis & Gyr Soc. Anon.—" Means for stabilizing the voltage of a control frequency current superposed on a power network." 11802. July 9th, 1943. (592941.)

E. R. Goldfield and E. B. Graves.—" Sealed housing for X-ray tubes." 12725. July 4th, 1944. (592848.)

Radio Corporation of America.—" Electrical bonding apparatus." 14676. August 23rd, 1943. (592801.)

English Electric Co., Ltd., and G. F. Tagg.—" Electrical device for the solution of differential equations." 15381. August 11th, 1944. (Cognate application 4065/45.) (592943.)

S. Smith & Sons (England), Ltd., and W. O. Davis.—" Speed governor controlled electric switches." 17907. September 19th, 1944. (592851.)

Siemens Bros. & Co., Ltd., and F. A. Stallworthy.—" Electrical selective signalling systems." 25245. December 15th, 1944. (592856.)

1945

Cinema-Television, Ltd., and R. B. Head.—" Methods of depositing layers of fine particles of luminescent material on supports." 2593. February 1st, 1945. (592860.)

E. W. Anderson and T. J. McDermott.—" Thermionic valve circuits." 4028. February 16th, 1945. (592804.)

Aktiebolaget Elektrolux.—" Absorption refrigerating apparatus." 4446. March 17th, 1944. (592955.)

Aktiebolaget Ljungstroms Angturbin.—" Securing of blades to blade rings of radial flow turbines." 5230. March 2nd, 1944. (592956.)

Benham & Sons, Ltd., W. L. Clarke and N. E. Lees.—" Electric cooking apparatus." 8030. March 29th, 1945. (592986.)

Westinghouse Electric International Co.—" Surface treatment of laminations of ferrous magnetic material." 8290. April 9th, 1944. (592987.)

Lumalampan Aktiebolag.—" Device consisting of holder and cap for tubular electric lamps." 8515. March 30th, 1944. (592957.)

British Thomson-Houston Co., Ltd., and S. H. Franklin.—" Devices for automatically controlling ignition timing in internal-combustion engines." 9729. April 18th, 1945. (592869.)

Titan Lift Co., Ltd., and J. A. Fairclough.—" Electro-mechanical combination lock for single or double leaf hinged landing doors of lift shafts." 10110. April 23rd, 1945. (592871.)

Mullard Radio Valve Co., Ltd., and J. E. Keddie.—" Manufacture of electro-acoustic apparatus." 10397. April 25th, 1945. (592873.)

Allmanna Svenska Elektriska Aktiebolaget.—" Compressed air blast electric circuit breakers." 11081. May 11th, 1944. (592962.) " Valve for compressed air blast circuit breakers." 12414. May 20th, 1944. (592965.)

Siemens Bros. & Co., Ltd., and D. P. Long.—" Automatic telephone systems." 11442. May 4th, 1945. (592989.)

Sun-Vic Controls, Ltd., and N. R. Davis.—" Electronic relay arrangements." 11592. May 7th, 1945. (Cognate application 10660/46.) (592964.)

Standard Telephones & Cables, Ltd., B. B.

Jacobsen and F. L. J. Jarvis.—" Electrical condensers." 12312. May 16th, 1945. (592991.)

Evershed & Vignoles, Ltd., and W. T. Marchment.—" Devices for regulating or controlling the level of liquid or other flowing material." 13155. May 25th, 1945. (592898.)

N. Straussler.—" Motor and compressor units for refrigerators." 13169. May 25th, 1945. (592821.)

Vaughn Machinery Co.—" Methods of and apparatus for surface conditioning wire and the like." 13284. April 19th, 1944. (592825.)

Fuel Research Corporation.—" Grinding mills." 13463. May 12th, 1944. (592828.)

Wilkins & Mitchell, Ltd., and E. W. Wilkins. —" Power-driven wringing machines." 13629. May 31st, 1945. (592830.)

Western Electric Co., Inc.—" Metal to glass seals and methods of making them." 13809 February 29th, 1944. (592831.)

E. A. Johnson.—" Rectifying or demodulating circuits." 13929. June 2nd, 1945. (592835.)

Metalectric Furnaces, Ltd., F. J. Morgan and A. V. Francis.—" Muffle furnaces." 14114. June 5th, 1945. (592902.)

English Electric Co., Ltd., and R. D. Ball.— " Dynamo electric machines." 14142. June 5th, 1945. (592904.)

English Electric Co., Ltd., and R. K. Whitehead.—" Price-changing device for prepayment meters." 14143. June 5th, 1945. (592905.)

Muirhead & Co., Ltd., and J. A. B. Davidson. —" Thermionic valve oscillators." 14180. June 5th, 1945. (592997.)

Standard Telephones & Cables, Ltd., and R. W. Hardisty.—" Volume control and mixing arrangements in broadcasting systems and the like." 14559. June 8th 1945. (592917.)

English Electric Co., Ltd., and G. F. Tagg.— " Power factor compensation device for induction type watthour meters." 14731. June 11th, 1945. (593010.)

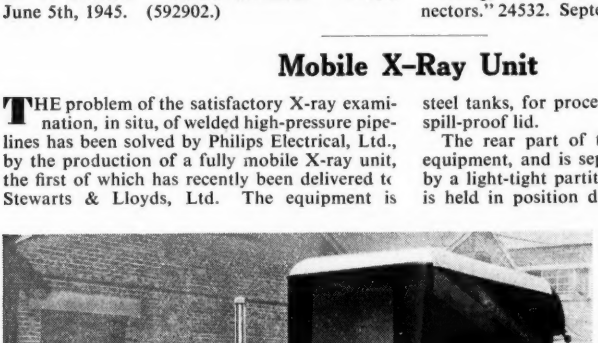
Babcock & Wilcox, Ltd., R. H. Evans and C. H. Sparks.—" Centrifugal dust separators." 14980. June 13th, 1945. (592927.)

Firth Co., Ltd., and P. E. Semler.—" Wire drawing apparatus." 16229. June 26th, 1945. (592837.)

Clang, Ltd., and A. Barnett.—" Electrical connectors." 24532. September 21st, 1945. (592811.)

Mobile X-Ray Unit

THE problem of the satisfactory X-ray examination, in situ, of welded high-pressure pipelines has been solved by Philips Electrical, Ltd., by the production of a fully mobile X-ray unit, the first of which has recently been delivered to Stewarts & Lloyds, Ltd. The equipment is housed in a 4/5-ton van, the body of which is divided into compartments and provides a complete darkroom service. The necessity for this apparatus has arisen in connection with the urgent need for the provision of generating stations.



Complete " Macro 300 " inspection unit assembled at foot of the ramp

The darkroom arrangements of the van consist of a special film loading bench for the storage of X-ray films, chemicals, cassettes, etc.; the processing unit and a wash basin; special " Philora " viewing lantern ; facilities for the quick drying of X-ray film; and stainless steel tanks, for processing, each with a clip-on, spill-proof lid.

The rear part of the van houses the X-ray equipment, and is separated from the fore part by a light-tight partition. The equipment itself is held in position during transit by means of spring-loaded attachments. For ease in unloading, the tailboard of the van is designed as a double-hinged ramp. The h.t. generators for the X-ray equipment are moved by small two-wheeled trollies. The type of equipment supplied for the van is a Philips " Macro 300 " inspection unit, capable of examining steel up to a thickness of 4½ in.

The lighting in the darkroom is concealed in the angles of the roof and consists of six 10 in. tubular strip lights fitted into reflectors having a flat opal glass front. Two refrigerator-type ventilators are fitted in the roof and a Vent-Axia exhaust fan in the forward bulkhead of the darkroom. Special cable and hose drums are housed in compartments below the chassis which, when coupled to external supply sources, feed the various water and electrical circuits. A 34-gal. capacity storage tank is housed above the driver's cabin to boost the water pressure.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Australia.—Department of Civil Aviation. December 3rd. Radar distance measuring equipment beacons. Tender and Contract Committee, Melbourne.

Queensland State Electricity Commission. November 19th. Hydro-electric plant for Somerset dam (Spec. 63).

Edinburgh.—November 10th. Electricity Department. 33-kV ring main switchgear and 5,000-kVA transformers. (October 10th.)

Eston.—November 15th. U.D.C. E.h.v. ring main switchgear, l.v. switchgear, one 500 kVA transformer, and e.h.v. and l.v. underground cables. (October 17th.)

Manchester.—November 10th. Electricity Committee. 33,000-V cable. (See this issue.)

Martley.—November 3rd. R.D.C. Two sets of direct-coupled electrically driven centrifugal pumps for crude sewerage.—Willcox, Raikes & Marshall,33,Great Charles Street,Birmingham,3.

New Zealand.—Hydro-Electric Department. January 20th, 1948. High-voltage control and relay boards for Otahuhu and Bunnythorpe substations (Contracts 44-47). Tenders Committee, Wellington.

Plymouth.—November 1st. Electricity Department. Meters, time switches, underground joint boxes, underground disconnecting boxes. (October 17th.)

Salford.—November 10th. City Council. Electric lighting installation at the Marlborough Road primary school. (See this issue.)

Worksop.—Electricity Department. E.h.v. and l.v. cables. (See this issue.)

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Ashton-under-Lyne.—Houses (54) for T.C.; J. Ridyard & Sons, Ltd., builders, Railway Saw Mills.

Bathavon.—Houses (52), Church Road, and 48 at Eckweek Road; R.D.C. surveyor, 10, Green Park, Bath.

Bridgnorth.—Pithead baths, Alveley Colliery; C. K. Kemp, Miners' Welfare Commission, 5, Old Queen Street, S.W.1.

Camborne, Redruth.—Traditional houses (38), Paynters Lane End; U.D.C. surveyor, 3, West End, Redruth.

Canning Town.—Rebuilding Silvertown Mills for Spillers, Ltd.; L. G. Mouchel & Partners, 38, Victoria Street, S.W.1.

Chesterton.—Tile works; A. Cotton, Son & Richards, architects, Piccadilly, Tunstall.

Chorley.—Extensions to Nurses' Home at Chorley and District Hospital (£12,000); J. Lee & Sons, Ltd., Yarrow Street.

Coventry.—Rebuilding St. Francis' Church, Radford Parochial Council; the vicar.

Eccles.—Extensions to works for Lankro Chemicals, Ltd., Salter Lane; I. E. Meredith, 7, Greenbank Avenue, Hall Green, Birmingham.

Glasgow.—Extensions to works for Wylie & Co., Ltd., Towlerhill Road; A. V. Wilson, 9, Calder Street, Motherwell.

Hatfield.—Junior mixed infants' school, Brookmans Park; C. H. Aslin, County Hall, Hertford.

Hendon.—Flats (120).—Cricklewood Lane; A. O. Knight, Town Hall, N.W.4.

Kidderminster.—Works, Stourport Road, for Robinson Bros., Ltd., chemical manufacturers, Ryders Green, West Bromwich.

Lewisham.—Rebuilding Barlings House and Dereham House, for L.C.C.; Galbraith Bros., Ltd., 34, High Holborn, W.C.1.

Lindsey.—School, Ferry Road, Crosby; county architect, Newland, Lincoln.

Manchester.—Extensions to factory, 399, Oldham Road, Watts & Corry, Ltd.; H. Elder, architect, 66, Manchester Road, Wilmslow, Cheshire.

Additions to Saw Mills, Robinson Street East, Ancoats; Moston Brick & Building Co., Ltd., Kenyon Lane, Moston.

Canteen for 500 meals, Cavendish Schools, Hulme, for E.C.; L. C. Howitt, city architect.

Warehouse, Knowsley Street and Red Bank; Max Bor, Knowsley Street Mills, Cheetham.

Butchery, 231, Stretford Road, Hulme, J. H. Dewhurst, Ltd., meat purveyors, Smithfield, E.C.1; J. Mills, builder, 19, Blake Street, Hulme.

Extensions to works, Wilmslow Road and High Street; Manchester Garages, Ltd., Wilmslow Road.

Chorlton Park, secondary school for E.C.; Jones & Craig, builders, 11, Brookleigh Road, Withington.

Mansfield.—Aluminium houses for miners (131); borough engineer, Carr Bank.

Morecambe.—County primary school, Trumacar Road, for Lancashire E.C.; G. Noel Hill, county architect, County Offices, Preston.

Muswell Hill.—Rebuilding 20 war destroyed houses, Wilton Road; Moiret & Wood, 21, Willifield Way, Hampstead Garden Suburb.

Newcastle (Staffs).—Engineering workshop, Chesterton Tileries, Audley Road, G. H. Downing, Ltd.; Wood, Goldstraw & Yorath, architects, Victoria Buildings, Station Road, Tunstall.

New Moston.—Houses (85), J. Saxon & Son, builders; Wheeler, Wood & Hobson, architects, 26, King Street, Manchester, 2.

Northampton. — Hotel, London Road; Northampton Brewery Co., Ltd., Bridge Street.

Nottingham.—School, Bilborough Estate (£37,350); borough engineer, Guildhall.

Oldham.—Works extensions, Newbreck Mills, Huddersfield Road, for the Strata Engineering Co., Ltd.; Woodcock & Johns, 12, Netherley Street.

Dance hall extension and café, New Radcliffe Street; E. A. Newton, Leach & Booker, architects, 28, Kennedy Street, Manchester, 2.

Oswestry.—Agricultural houses (50); R.D.C. surveyor, Bailey Head.

Oxford.—Nurses' hostel, Radcliffe Infirmary; Collcutt & Hamp, 126, Wigmore Street, W.1.

Plymouth.—Works at Marsh Mill, for Tecalemit, Ltd., Great West Road, Brentford; Gallanough, Nichols & Walls, Frankfort Street.

Portsmouth.—Modernization of Royal Naval Barracks, for the Admiralty; E. Berry Webber, consulting architect, 39, Gordon Square, London, W.C.1.

Rickmansworth.—Civic restaurant at The Bury; C. G. Ransome Williams, clerk, Council Offices.

Rotherham.—Factory, Eastwood Trading Estate; Disabled Persons' Employment Corporation, Ltd., 25, Buckingham Gate, S.W.1.

Rugby.—Factory, Benn Street, C. Watts & Sons, Pennington Street; Franklin, Newman & Press, 20, Regent Place.

St. Austell.—Houses (82), St. Dennis; R.D.C. surveyor, 1, High Cross Street.

Salford.—Central school canteen, Market Street and Ford Street, for E.C.; W. A. Walker, city engineer, Town Hall.

Southend-on-Sea. — Infants' department (£50,000), at Prince Avenue School; borough engineer, Municipal Buildings.

Stockport.—Additions, Coronation bakery, Swallow Street; P. Peirce & Son, architects, 30, St. Petersgate.

Stockton.—New factory on North Tees Trading Estate; Crawford & Ellis, architects, 10, Market Place, Bishop Auckland.

Stretford.—Mortuary, Chester Road, for T.C.; A. H. Perry, borough engineer.

Factory and offices, Warwick Road South, Major, Robinson & Co.; Cruickshank & Seward, architects, 16, Princess Street, Manchester, 1.

Stroud.—Houses (118), Park site; R.D.C. surveyor, John Street.

Sunderland.—School, Hill View (£64,000); Newrick & Blackbell, architects, 24, John Street.

Surbiton.—Factory and office premises, Cox Lane, for Combustions, Ltd., Kingston-on-Thames; Hal Williams & Co., 43, Bedford Square, W.C.1.

Thornaby.—Extensions to works for the Lanehouse Street Metal & Welding Co., Ltd., Thornaby Road.

Tynemouth.—New bakery for Purch Bakeries, Ltd., Waterville Road; Gray & Kinghorn, architects, Camden Street, North Shields.

Wellington.—County Primary School, Barn Farm Estate, Salop E.C.; A. G. Chant, county architect, 5, Belmont, Shrewsbury.

Wem.—Agricultural houses (72); surveyor, Rural Council Offices.

Wembley.—Block of 22 flats, Harrow Road; Shaw & Lloyd, 74, Great Russell Street, W.C.1.

West Bromwich.—Extensions to works; Sections & Tubes, Ltd., Lyng Lane.

Willesden.—Extensions to works, for E.N.V. Engineering Co., Ltd., Hythe Road; H. C. Smart & Partners, 120, Moorgate, E.C.2.

Wolverhampton.—Dining room and kitchen, Hordern Road Senior School, for E.C.; K. S. Rock & Co., Ltd., builders, Temple Street.

Worthing.—Theatre wing at Worthing Hospital; Thompson, Walford & Fielder, Leadenhall Buildings, London, E.C.3.

Public Services

Discursive Address by I.E.E. Midland Centre Chairman

IN his address at Leeds as chairman of the North Midland Centre of the Institution of Electrical Engineers, MR. E. S. RITTER (G.P.O.) spoke first of such economic considerations as the profit motive, plant depreciation and business reserves.

He then pointed out how the laws of chance helped a public service to be conducted without providing for the maximum possible demand, which was neither economically desirable nor normally feasible.

Turning to water power, Mr. Ritter remarked that plant-siting considerations had been changed by the existence of electricity distribution networks, which should render it economical to develop many small schemes for feeding directly or indirectly into the grid system.

The Shannon and Erne schemes in Eire were described with the aid of lantern slides as well as the Limavady plant on the River Roe in Northern Ireland.

The address concluded with reference to investigations conducted in the P.O. Circuit Laboratory into current surging when switching small transformers on to the mains.